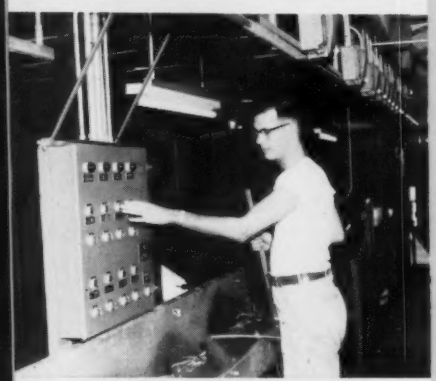
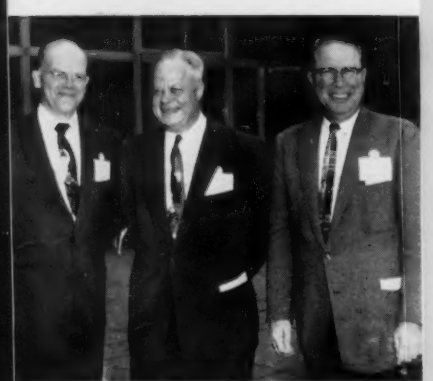
Loadbuster Is Product News... 66



All Overhead in This Cannery..103

Gets Hep on LBE.....112



RMEL Officers.....119

ELECTRICAL WEST

Part I

November 1956
50 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

First Atomic Power Station..... 90

Sales Guide News Letter..... 79

Help Fill the Vacuum..... 87

New Look for Schematic Diagrams..... 96

Contractors' News Letter..... 99

"Let's Talk Business".....135

Manufacturers' Directory Issue

Edison
is demonstrating
the speed of
electric cooking...
to speed up
your
electric range
sales

Electric cooking is fastest!

Now!
Hot soup
in 68 seconds
when you
cook
electrically!

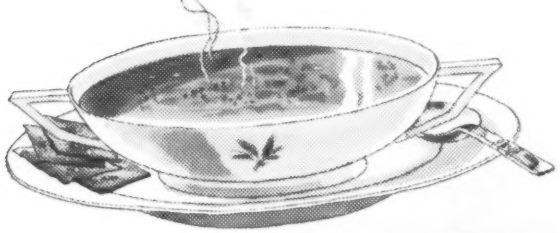
TODAY, NOTHING COOKS FASTER than a modern electric range. Hot soup in 68 seconds. Bacon and eggs in 3½ minutes. Instant coffee in 60 seconds. Fry, bake, broil or roast — electricity does it better.

▶ THERE'S MORE: your kitchen is cooler. And cleaner. Pots and pans stay mirror-bright. Kitchen walls look fresh and new twice as long.

▶ SOMEDAY YOU'LL COOK on a modern electric range. It's almost inevitable. But why postpone it? Edison rates are among the lowest in the country. What's more, Edison services your range *free* as long as you own it. (The only charge is for parts, when needed.)

▶ IF YOU'RE STILL COOKING the old way, it's simply because you haven't seen the new electric ranges at your appliance dealer's.

▶ SEE THEM — and see how easy modern cooking can be.



SOUTHERN CALIFORNIA Edison COMPANY

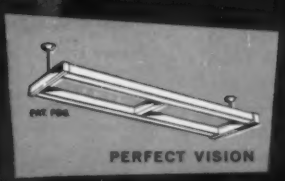
LIVE BETTER — ELECTRICALLY!

see the man from Smoot-Holman first!...

...for the best in school, commercial and industrial lighting

No matter how difficult the illumination problem — the Smoot-Holman lighting expert is the **man to see!** Here is trained "know-how" backed by Smoot-Holman's modern plant facilities and quality lighting equipment.

Call your local Smoot-Holman office or write direct. Ask to **see the man** from Smoot-Holman.



SMOOT-HOLMAN

INGLEWOOD, CALIFORNIA

We support the National Lighting Bureau

service in the west and southwest for all school, commercial and industrial lighting

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity."

Contents copyright. Seventieth year of publication.

George C. Tenney, Publisher
C. W. Leihy, Editor
W. A. Cyr, Consulting Editor
Peggy Boyer, Associate Editor
Jack Robinson, Engineering Editor
Dale VanHorn, News Editor
Miriam Stuart, Editorial Assistant
John Cootz, Typography

CONTENTS

VOL. 117, NO. 5 NOVEMBER 1956

Help Fill the Vacuum by Oliver F. Burnett 87

ENGINEERING

First Atomic Power Station by A. C. Werden Jr. 90
345-kv Line in Service 94
New Look for Schematic Diagrams by Marvin Moler 96

LIGHTING AND WIRING

All Overhead in This Cannery 103
Means of Ionizing the Air by Tom Hughes 104
NECA Meets in San Francisco 106

MARKET DEVELOPMENT

Gets Hep on LBE 112
Future Market Possibilities 114
NARDA Profit Clinics 115

ASSOCIATIONS

Dangers of Federal Monopoly 119
"Let's Talk Business" 135
SW Inspectors' Workshops Succeed 138

DEPARTMENTS

Bulletins 73
Contractors' New Letter 99
Electra's Husband 76
Editorials 84, 110
New Products 66
News 145
News Roundup 6
PCEA 124
Sales Guide News Letter 79
Advertising Index 168

Next Month

An article on customer relations will be a feature in December. Also scheduled is "Give Away Versus the Take Away,' which deals with tax problems.

Other features will be on the ABCs of system loading, new code recommendations on raceway fill, market development plans in southern California.

In addition, there will be the regular departments—the News Roundup, new products and news of the industry.

ADVERTISING REPRESENTATIVES

Chicago (11) ..... Michael I. O'Connell, 520 N. Michigan Ave.
Cleveland (15) ..... Frank Seiler, R. A. Hubley, 1510 Hanna Bldg., Superior 1-7000
Los Angeles (17) ..... E. E. Schirmer, 1125 West 6th St., MA. 6-9351
New York (36) ..... G. W. Simpson, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, Dick Alcorn, 68 Post St., DO 2-4600
Bernice Johnston, Advertising Production Manager
Offices: Atlanta, Boston, Dallas, Detroit, Philadelphia, Pittsburgh, St. Louis

THE ELECTRICAL WEST EDITORAL ADVISORY BOARD—UTILITIES: N. R. Sutherland, President, Pacific Gas and Electric Co., San Francisco; J. A. Hale, Vice-President, Utah Power & Light Co., Salt Lake City; Glenn L. Jackson, Vice-President, California-Oregon Power Co., Medford; Kinsey M. Robinson, President, Washington Water Power Co., Spokane; Thomas W. Delzell, Chairman of the Board and Chief Executive Officer, Portland General Electric Co.; W. C. Mullendore, Chairman, Board of Directors, Southern California Edison Co. Ltd., Los Angeles. MANUFACTURERS: J. H. Pengilly, Executive Vice-President, Square D Co., Los Angeles; Walter Maytham, Vice-President, Westinghouse Electric Corp., San Francisco; A. D. Bragg, Manager, Pacific District, Apparatus Sales Division, General Electric Co., San Francisco. WHOLESALERS: A. H. Meyer, Leo J. Meyberg Co., San Francisco; Harry C. Gerster, Vice-President, General Electric Supply Co., Los Angeles. CONTRACTORS: George Abbett, Abbett Electric Corp., San Francisco; Don Larson, Manager, Rocky Mt. Chapter, NECA, Denver. DEALERS: K. L. Hampton, Manager, Valley Electrical Supply Co., Fresno; J. C. Chamberlain, Secretary-Manager, Bureau of Home Appliances of San Diego County, San Diego.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity). NOVEMBER 1956. Vol. 117, No. 5. Published monthly by McGraw-Hill Company of California. **Executive, Editorial and Advertising Offices: 68 Post St., San Francisco 4, Calif.** Publication office: 1125 W. Sixth St., Los Angeles 17, Calif. James H. McGraw (1860-1948), Founder; Donald C. McGraw, Chairman of the Board; George C. Tenney, President; John W. Otterson, Vice-President; B. M. Boccoli, Secretary and Treasurer. **Subscriptions: Address correspondence to Electrical West—Subscription Service, 68 Post St., San Francisco 4, Calif. Allow 30 days for change of address. Please indicate position and company connection on all subscription orders.** Single copies 25c (November issue 50c). Subscription rates—U. S. possessions and Latin American Republics: $2 a year; $3 for two years; $4 for three years. Canada $2.50 a year; $5 for three years. All other countries $3 a year; $5 for two years; $6 for three years. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the act of March 3, 1879. Printed in U. S. A.

Copyright 1956 by McGraw-Hill Company of California. All rights reserved.

L-M's modern 1957 fluorescent luminaire is styled for handsome appearance, correct light distribution, and a lifetime of efficient, economical operation. It is the only fluorescent luminaire designed to take both present and future very high output fluorescent lamps.

Line Material Announces New, Advanced 1957-Style Fluorescent Luminaires

L-M's new fluorescent luminaires offer an exciting new look in street lighting equipment. The units provide more comfortable visibility, and greatly increase the scope of vision for both motorists and pedestrians.

L-M's new luminaires are the only units available today that are designed to take both present and future VHO (very high output) fluorescent lamps.

The new luminaires have a long, slim modern look, and retain all the outstanding performance characteristics of L-M's original design. Their broad, cool, white light source provides virtually glareless illumination —the ultimate goal in lighting.

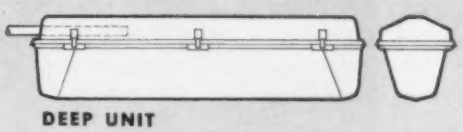
L-M's modern fluorescent luminaire distributes the light over a broad area, giving good balance between building and road surfaces.

These new street lighting luminaires are available in deep and shallow styles, in both four- and six-foot lengths. For other outdoor lighting applications, such as parking lots, store front lighting, etc., other styles are available.

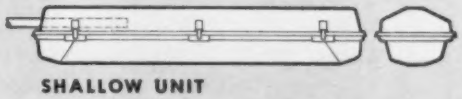
Get Complete Information

Get details of L-M's new 1957-style fluorescent luminaires. L-M Street Lighting Engineers will cooperate with you in designing the best lighting system for your area. Ask your L-M Field Engineer or Street Lighting Engineer for more complete information. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

277



DEEP UNIT



SHALLOW UNIT

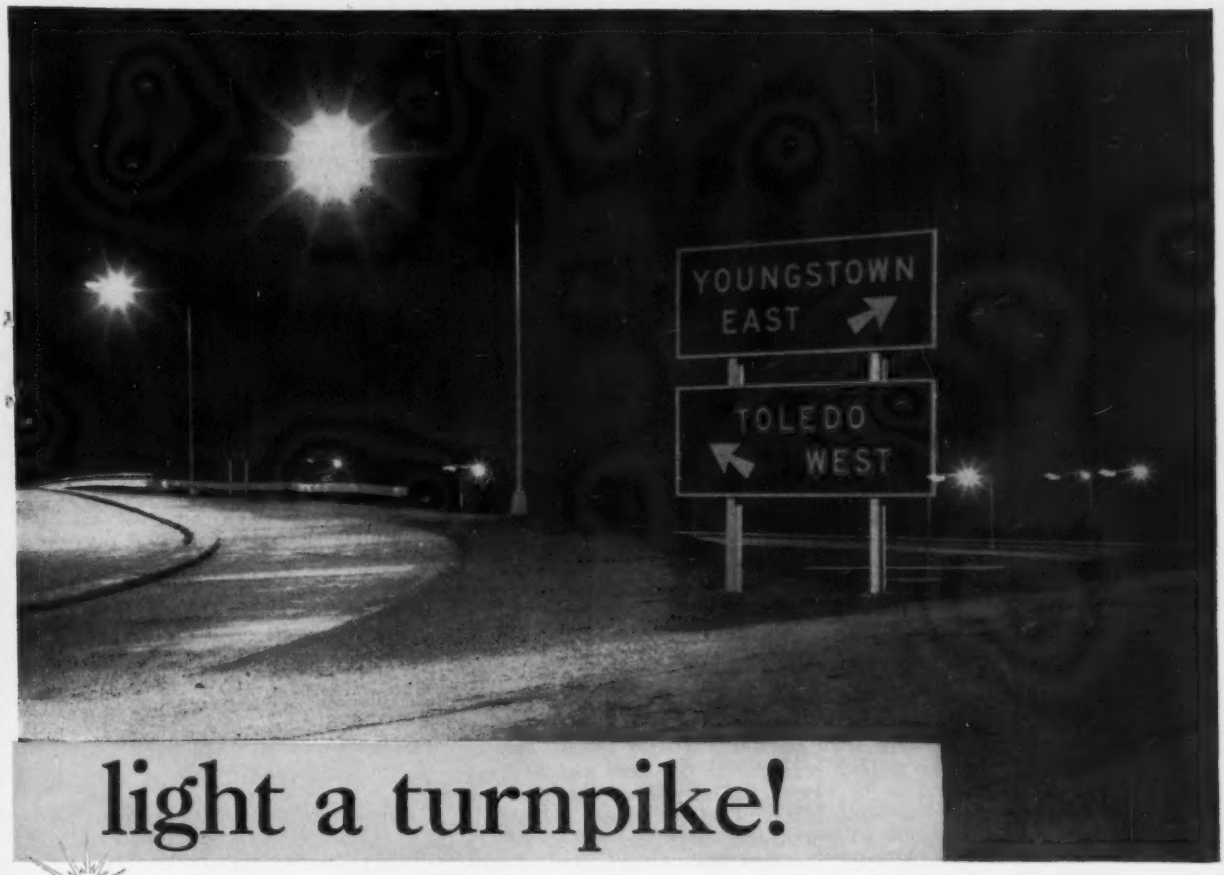
Deep and shallow units are available in both four- and six-foot lengths. L-M's new fluorescent luminaires provide excellent light distribution for all applications.

LM

LINE MATERIAL Street Lighting

A McGRAW ELECTRIC COMPANY DIVISION

HERE'S the way to



light a turnpike!

The new Ohio Turnpike, spanning the state from Pennsylvania to Indiana, is a model of modern highway construction. And one of the outstanding features of this road is the lighting of the interchanges.

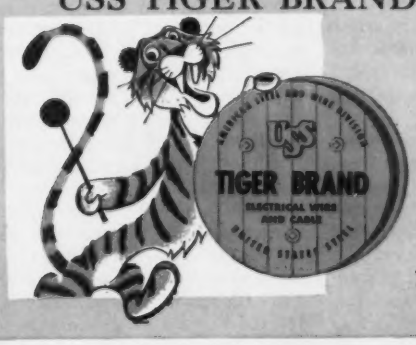
What an immense job it was to build this 241-mile road! Enough dirt was excavated to fill a two-lane tunnel 268 miles long. They dumped enough fill to cover 500 football fields to a depth of 28 feet. Carefully the bogs were drained, slides were stopped and the rock was blasted to make the great road possible.

Skillful engineering is apparent along every foot of the Turnpike—and this includes the selection of vital materials used to build it. Buried in the ground near the interchanges you'll find over half a million feet of Tiger Brand 3,000-volt internal shielded cable serving as main feeders. Many thousands of feet of Tiger Brand RR cable serve as bracket cable in the poles, and an additional quarter million feet of Tiger Brand cable grounds the entire system.

When you install Tiger Brand cable, you have gone a long way toward insuring a trouble-free wiring system.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TIGER BRAND ELECTRICAL WIRE & CABLE

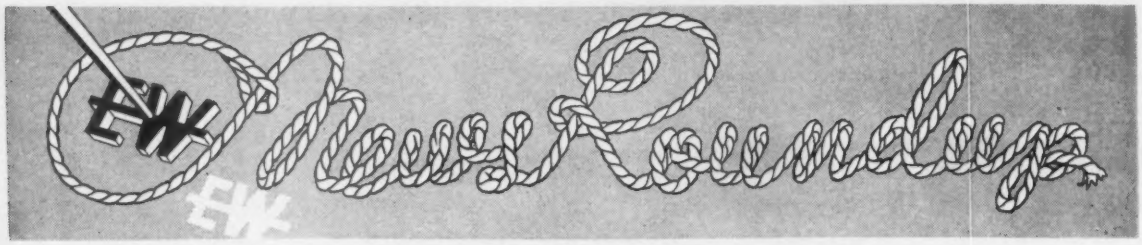


A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- machine tool and building wire
- special purpose wire and cable
- asbestos wire and cable
- paper and varnished cambric cable
- aerial, underground and submarine cable
- shovel and dredge cable
- mold cured portable cord

USS

UNITED STATES STEEL



SIGNIFICANT ITEMS FROM THE EDITORS' NOTEBOOKS

SAD MUSIC—Second verse to the wearisome same tune of public power groups vs Idaho Power Co. is being rendered by public power groups against Pacific Northwest Power Co.

In hearings before the Federal Power Commission the public power folks are trying to show that a high dam, Nez Perce, is far superior to the lower Mountain Sheep and Pleasant Valley Dams proposed by PNP.

But as usual, the public power lyrics are out of meter. The two smaller dams can be constructed without blocking the mouth of the Salmon River, an important fish spawning stream, while the Nez Perce site would block it off. And what is more important, the Corps of Engineers says that no solution to the fish passing problem is evident in the case of Nez Perce.

—EW—

The diplomacy required in these recurring hassels between public and private power interests brings to mind a definition of a diplomat carried in Line Material's *The Line*. "A true diplomat is a fellow who can tell you to go to hell so tactfully that you actually look forward to the trip."

—EW—

ALASKAN REACTOR—Preliminary studies for a new type of reactor were approved by the Atomic Energy Commission last month. A 10,000-kw demonstration nuclear power plant, a joint project by the Chugach Electric Assn. (Anchorage, Alaska) and the Nuclear Power Development Corp. of America, would use heavy water as a moderator and liquid sodium as a coolant.

This combination, according to AEC, would constitute a technical advance in reactor technology. Advantages claimed for the design include a high burn-up, long fuel life, compactness and the development of high temperatures at low pressures.

Ultimate cost would be in the neighborhood of $20,000,000.

One of the best stories going around industry about the shortage of engineers tells about the aviation company that sent out six "recruiters." None came back.

—EW—

D-C LINK—From England comes word that the joint committee set up by the Central Electricity Authority in England and Electricite de France has recommended a direct-current cross-channel connection between the two systems.

The scheme involves laying a single-conductor, 200-kv cable capable of transmitting between 120 and 150 mw between the continent and England. Previously investigated were the possibilities of a three-phase, 132-kv submarine tie but the success of the Swedish 100-kv, 60-mile direct-current connection with the island of Gotland plus the decreased exposure to damage from shipping in the heavily traveled channel tipped the scales in favor of the d-c project.

In addition, the economy resulting from a single cable and the ability to transmit agreed loads independent of the frequencies on the respective systems were major factors in arriving at the decision. The cost of the 24-mile d-c tie is estimated to be approximately $10,000,000.

Work is expected to begin early in 1957 with a completion date set for 1960.

—EW—

ATOM SPLIT?—Splitting atoms is old hat now. Splitting the Atomic Energy Commission into two parts isn't a new idea, but it's one that is creating some heat, too.

The Congressional joint committee on atomic energy is pressing for a separate agency for licensing and regulation—one apart from the agency that would operate AEC plants producing materials and conducting research.

Since the reorganization is premature, you can expect to see a congressional fight against it.

BUNDLING PROBLEMS—Bundling, a cozy courtship custom of the colonial era, has a new meaning to transmission engineers. The use of three or four small transmission line conductors, properly spaced, termed "bundle conductors," is a familiar practice in Europe. This scheme has marked electrical advantages over single conductor if the wire spacing is maintained in bad weather.

Washington State College Industrial Research Division, in conjunction with BPA and Kaiser Aluminum, is testing foreign spacer designs and the effects of vibrations resulting from ice unloading.

—EW—

The Los Angeles Department of Water & Power, just now preparing the site for the 936,000-kva Scattergood steam plant, has plans for another oceanside thermal station to be named the Haynes plant after a pioneer civic leader. It will be another part of the current $260,000,000, five-year expansion program. To help finance the program Los Angeles voters will be asked Nov. 6 to approve an increase in the revenue bonding capacity of the department.

—EW—

LONGER FRINGES—Fringe benefits cost the average employer $819 per employee per year. This figure results from a survey by the U. S. Chamber of Commerce of 1,000 companies and is important because it clearly indicates that weekly wages and hourly rates are no longer an accurate measurement of either worker income or the labor cost of doing business.

Although the survey reported that fringe payments varied widely among companies, the average was 20.3% of the pay roll or 39.2c per pay-roll hour. Of the dollar payments per employee, $254 were for pensions and insurance, $254 for vacations and holidays, $145 for old age insurance and unemploy-

To Serve Better - Electrically

KUHLMAN, ORIGINATOR OF "Quick Grip," INTRODUCES A

New High Voltage Bushing *

FOR RATINGS ABOVE 5000 VOLTS

Now, KUHLMAN affords new safety, new convenience and new speed in handling high voltage connections on cover bushings of pole type transformers.

In 1939, KUHLMAN introduced the first "Quick Grip" Bushing for 5000 volts and below. The principle of this bushing has, since then, been adopted by most of the country's leading transformer manufacturers. Linemen all over the world prefer KUHLMAN "Quick Grip" Bushings . . . no tools are necessary . . . no live parts are exposed . . . connections are simple, safe and fast. Check all these advantages:

Easy Installation –the line lead is simply inserted into the hole in either side of the bushing . . . a twist of the knob completes the job!

Complete Protection –the protective knob reduces effects of weather, corrosion and the possibility of animals and birds disrupting service.

Versatile Application –new cover type "Quick Grip" will soon be available on all pole type distribution transformers. Accommodates full range of EEI-NEMA wire sizes.

Your KUHLMAN agent will be happy to explain this high voltage "Quick Grip" Bushing . . . it is another KUHLMAN feature that has provided new standards of distribution transformer service and long life for America's leading utilities.

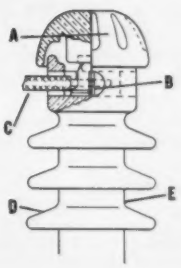
A—Hard rubber cap protects — simple clockwise rotation clamps lead firmly.

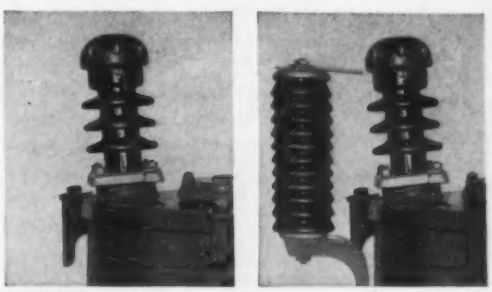
B—Gap Electrode

C—Line leads . . . can be entered from two sides.

D—Porcelain.

E—Corrugations provide ample creepage distance.





Conventional or CSP Application

KUHLMAN

* Patent Pending

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

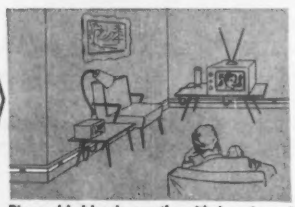
DISTRIBUTED BY MAYDWELL & HARTZELL, INC. Seattle • Spokane • Portland • San Francisco • Los Angeles • San Diego • Phoenix

Better
REWIRE on the SURFACE
with
WIREMOLD
and
PLUGMOLD

neat

Wiremold carries power to air conditioner

safe



Plugmold blends neatly with baseboard

- You can take advantage of the big rewiring market by using Wiremold and Plugmold . . . the *modern* way to wire and rewire.
- You can *pre-plan* every wiring job and follow the plan *easier* with *pre-engineered* Wiremold and Plugmold.
- You can do *more jobs,* control installation costs and *make more profit* on *every* job with Wiremold and Plugmold.
- You can build *more* customer satisfaction with Wiremold and Plugmold.
- Wiremold and Plugmold meet all wiring code requirements.

For further information
Write Dept. L-11

The WIREMOLD Company
HARTFORD 10, CONNECTICUT

ment compensation, $89 for rest periods and $77 for miscellaneous (maybe the coffee break?).

—EW—

THREE Rs—School construction reached a new record this year, according to the U. S. Office of Education. An all-time annual record of 67,000 classrooms will be added to the nation's educational plant by the end of 1956. Even with these new facilities, too many students still will have to attend split sessions or utilize makeshift classrooms.

School construction expenditures have jumped from an average annual outlay of approximately $300,000,000 prewar to more than $2 billion—all without federal aid.

—EW—

Utah Construction Co. is planning a steam-electric generating plant capable of producing 1,000,000 kw. The plant, which would be located on the banks of the San Juan River near Kirtland, will be fired with coal mined by the Navajo Tribe from deposits adjacent to the plant.

—EW—

STRENGTH RATING—Materials-testing brains have discovered a relation between the strength of poles and the specific gravity in four out of five species tested.

Indications are that this could become a new way to rate the strength of poles. If it proves out, the savings to pole users would be impressive, if not sensational.

Specific gravity rating shows that smaller poles would have the same strength as larger ones. With the cost of treating and shipping directly related to pole size, and amounting to about 40% of the total cost, the use of smaller poles would give direct and worth while savings.

—EW—

DATA BY WIRE—Data processing machines capable of thousands of operations per second often have to wait for the U. S. mail. A new data transmitter and receiver developed by IBM will enable punched card data to be sent over telephone or telegraph circuits with no delay to the machines.

Feature of the transceiver is the error detection and correction system that insures accuracy. Transmission allows for some error because of the "findamental redanduncy of Inglish."

TEACHERS—Gov. Ed C. Johnson of Colorado has a plan to ask the state's Board of Education to hire retired scientists, engineers and mathematicians to teach in public schools.

He got the idea from Dr. Joseph W. Barker, president of the American Society of Mechanical Engineers, who said, "There are simply not enough people coming out of the colleges to supply the teaching need for a greater number of new students."

—EW—

RECTIFIERS—Westinghouse engineers at the AIEE convention stated that "general successful application of the silicon rectifier may be looked for in the next few years."

General Electric engineers at the same meeting discussed the use of direct water cooled germanium power rectifiers. The cells can be easily replaced and the cost per kilowatt is down. Transformerless units have outputs of nearly 10 kw per cubic foot.

—EW—

Two hundred pound weights attached to crossarms on the Salt River Power District's 69-kv lines will probably cause some comments about the effects of the heat. Salt River engineers, with a method in their madness, are testing the wishbone structure in anticipation of a 161-kv line using insulators weighing 200 lb more.

—EW—

CRYOGENICS—If that is a new word for you, it's also a new science that you'll be hearing more about.

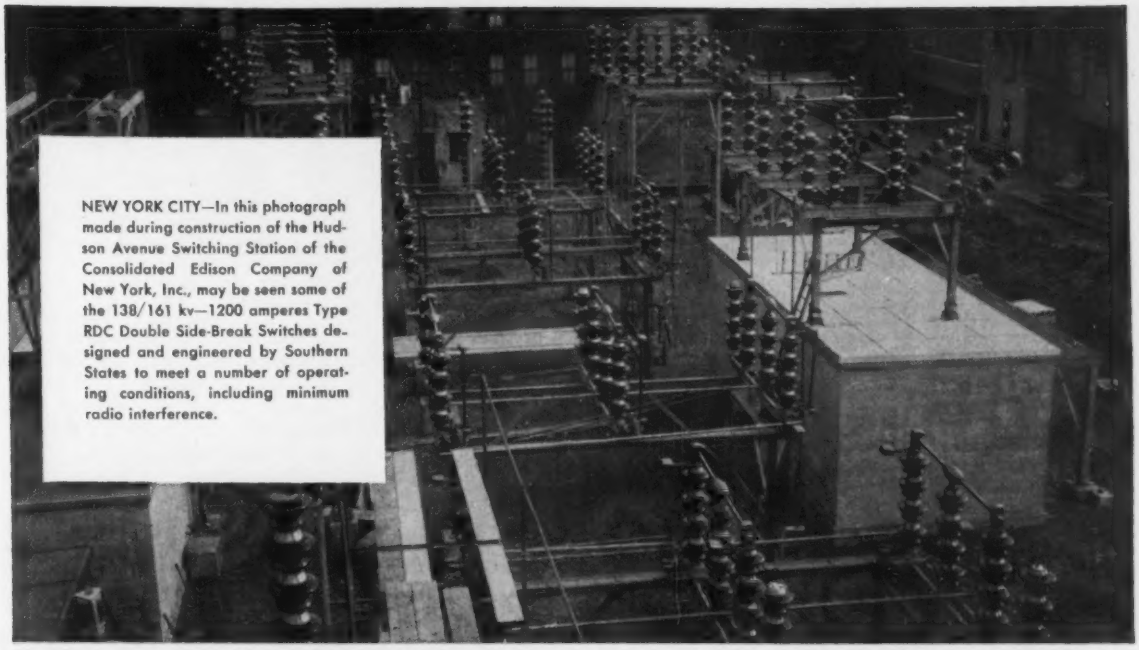
Cryogenics is another name for low temperature research that seems to be unlocking the door to a vast new area of improved products and processes.

At near absolute zero, the properties of metals change, plastics can be machined, complicated chemical separations are possible.

Boulder, Colo., is the U. S. center for such studies, which are carried out in a new "cold factory" operated by the National Bureau of Standards.

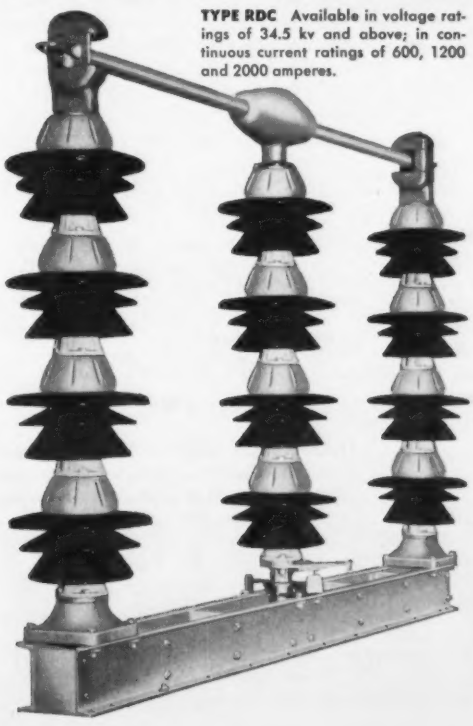
—EW—

SOVIETS PLEASE COPY—A glimpse of the broad base upon which the American economy rests can be gained from recent studies made by the New York Stock Exchange. For example, 8,630,000 individuals now own stock in publicly held companies. Women outnumber men as shareholders. Other facts to disconcert the



NEW YORK CITY—In this photograph made during construction of the Hudson Avenue Switching Station of the Consolidated Edison Company of New York, Inc., may be seen some of the 138/161 kv—1200 amperes Type RDC Double Side-Break Switches designed and engineered by Southern States to meet a number of operating conditions, including minimum radio interference.

Consolidated Edison Picks Type RDC Switches For its Hudson Avenue Switching Station



TYPE RDC Available in voltage ratings of 34.5 kv and above; in continuous current ratings of 600, 1200 and 2000 amperes.

The newest member of Southern States' complete line of air break switches was chosen by Consolidated Edison for its recently completed Hudson Avenue Switching Station.

The Type RDC has an RIV of less than 500 microvolts, a primary requirement for this station located in Brooklyn, New York.

There are many other advantages of this double side-break switch, including:

- **High momentary current rating**
- **Streamlined, corona-suppressing contours**
- **Minimum number of current interchange points**
- **Shuntless design**
- **Wide angle blade rotation**
- **AMPLITACT® silver-to-copper contacts**
- **Shielded mechanisms—complete icing protection**
- **Greaseless, non-corroding ball bearings**
- **Switch blade is one continuous member**

Your Southern States representative will be glad to give you more information about this new switch.

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto

NEW, IMPROVED TYPE

screw anchor expanders

quickly set anchors in masonry of any thickness, holes in varying depth

Now, with the GREENLEE Screw Anchor Expander you can rapidly and *securely* set lead screw anchors *flush* with the surface of masonry . . . *regardless of its thickness . . . regardless of hole depth*. Eliminates all guesswork . . . the expander tool positions the anchor *positively* every time. Fast, easy operation. Simply drill hole, screw lead anchor onto expander, insert in hole, then strike the expander head with hammer or mallet. It is the ideal tool for setting anchors to hold meter boxes, lighting fixtures, hangers, and other equipment. Six sizes for the most widely used sizes of screw anchors. Write for descriptive folder.

TOOLS FOR CRAFTSMEN

GREENLEE

GREENLEE TOOL CO.

1771 COLUMBIA AVE., ROCKFORD, ILL.

disclaimers of capitalism are the average income of today's shareholder ($6,200); the rising rate of share ownership (up 33% in the past four years with half of that rise taking place in 1955); and the location of stockholders (the greatest growth taking place in communities below 25,000 population).

Add all this to the millions of other people who own a share in America through life insurance, saving bonds and partnerships in small business operations. The result is a pretty impressive total of citizens who have a stake in free enterprise.

—EW—

RHUBARB — When the National Labor Relations Board let nine nonprofessional employees vote with 233 professionals to determine whether a certain union should represent the engineers involved, the board was seemingly playing toesies with the intent of the Taft-Hartley Act.

According to the law, the professional engineers must vote their approval of allowing nonprofessional votes to be included with their own.

At the Buffalo plant of Westinghouse the nine nonprofessional votes were included with the professional without the engineers' approval. It is conceivable, then, that the voting could be close enough for the nonprofessional ballots to tip the scales in favor of a particular collective bargaining agency, even though the majority of professionals desired a different one.

The National Society of Professional Engineers is contesting the vote.

—EW—

Public Service Co. of Colorado is happily going to the dog track. Clover Leaf Dog Track, near Loveland, installed 18 electric heaters in the grandstand to warm things up for bettors. The utility company reports that the heaters consume as much electricity in an hour as the average residence (without electric heat) uses in a month. That's better than winning a quinella every night.

—EW—

FINGER-TIP FACTS—The managements of Utah Power & Light Co. and Western Colorado Power Co. make it easy for employees to be well informed about their companies. They have compressed interesting statistics and facts covering wages, operating data, rates, taxes and financing into a wallet-size card that will help answer just about any question a customer could ask.

The card was distributed through the company magazine and spot checks indicate that about 80% of the employees have made it a permanent addition to their wallet or pocketbook.

Maybe it's popular because everybody likes to be considered an authority—and this little memory jogger makes it possible.

—EW—

Westinghouse engineers have developed a rugged, simple, circuit breaker using sulphur hexafluoride as the interrupting medium. The unit, with 1,000,000-kva interrupting rating, has been completely tested at 115 kv. The breaker is designed for a large number of operations with a minimum of maintenance.

—EW—

STOCK PLAN — Key employees of Montana Power Co. take advantage of the company's policy of offering them options on specially set up common stock. A recent issue authorized by the Federal Power Commission numbers 100,000 shares—and the number was determined by a prior census of prospective buyers.

Advantages of the plan are many. A stockholder-executive will probably take even more interest in company affairs, he will be less easily wooed away by other industries and it places the company in a better position to attract future executives. Last, but by no means least, advantage is that it provides a way to have a good income without the tax bite from straight salaries.

—EW—

Ole Svensen, our rugged friend of the right-of-ways, says: "It's too cussed bad that the fools that shoot at transmission lines are smart enough to get clear back in the boondocks to do it."

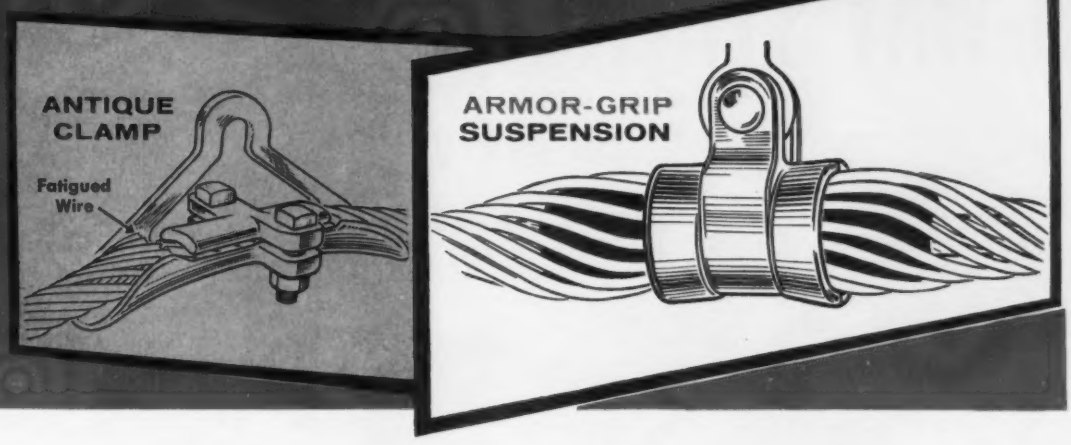
—EW—

HAWAIIAN BIDS — The Hawaiian Electric Co. is suggesting that the islands are as good a place for business as they are for pleasure.

In an attractive brochure the utility has outlined market data, employment statistics and other information needed when plant location experts get into a huddle over the site for new production facilities.

It shouldn't be hard to convince many executives that a plant in Hawaii

"PERFECTING not PERFECTION is our goal" *



"they both suspend the conductor, BUT . . ."

. . . *yesterday's answers* are not good enough. Today's will need improving tomorrow.

Take the problem of vibration fatigue. Failure of strand because of vibration or galloping does not occur in mid span. But it becomes a real problem at points of stress concentration, such as the end of the clamp keeper—at mass concentrations, such as at clamps, dampers and rigid splices—or at wearing points at loose attachments or fastenings.

Yesterday's answer—Preformed Armor Rods, introduced by Preformed Line Products Company in 1947.

Today's answer—PLP Preformed Armor with pitch direction the same as conductor strand and pitch length less than that of strand (Patent No. 2,609,653). When used in conventional clamps:

- it extends uninterrupted conductor life
- it eliminates wear possibilities
- it prevents excessive mass and stress concentrations

Tomorrow's answer is here today: the Preformed armor rod principle carried one step further in Preformed's ARMOR-GRIP SUSPENSION (Patent No. 2,722,393), the entirely new concept in suspension design.

The Armor-Grip Suspension Unit is a "floating suspension"—the conductor is cradled in neoprene and firmly gripped only by the custom-designed Preformed Rods which distribute their pressure over a relatively large area. The result: no wear possibilities—no mass concentrations—*and no clamping stress concentrations.*

This is another example of PLP research laboratories at work. Ever improving methods, materials and solutions is our goal. Call a PLP Representative today and ask for a demonstration.

* *John Dewey, "The Reconstruction of Philosophy"*

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

PLP

PREFORMED LINE PRODUCTS COMPANY

5349 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

TELEPHONE: CLEVELAND EXPRESS 1-3571

KILLARK FITTINGS

offer you

3-WAY STRENGTH

on every job!

1 Strength in METAL

Non-rusting aluminum plus a special blending of alloys for greater malleability and resistance to shock and strain far beyond on-the-job needs.

2 Strength in DESIGN

Carefully engineered for maximum performance, designed to utilize inherent metal-strength to the fullest.

3 Strength in MANUFACTURE

Die-cast under 10,000 lbs. of pressure to produce a tougher, closer-grained metal.

GET IN TOUCH WITH THE KILLARK DISTRIBUTOR SOON

Los Angeles.....412 Seaton Street
San Francisco.....714 Harrison Street
Seattle.....4130 First Ave., So.
Denver.....1073 Galapago
Kansas City, Mo.....616 W. 26th Street

Canadian Representatives

Vancouver 9, B. C.....551 W. 8th Ave.
Edmonton, Alberta.....7608 88th Ave.

Killark ELECTRIC MANUFACTURING COMPANY

3940 EASTON • ST. LOUIS 13, MO.

that fitted into the economic scheme of things might have, shall we say, fringe advantages?

—EW—

Hubbard & Co. is helping with Live Better—*Electrically* by giving the emblem space in the *Hubbard Linebuilder*. LBE also received hearty endorsement in a *Linebuilder* editorial. This is just another one of the many little things that are putting LBE over.

—EW—

SCARED—Scared is what the supporters of the partnership power policy should be in Washington State.

Gov. Arthur B. Langlie, strongly in favor of the Eisenhower power policy, was nominated by the Republicans for U. S. Senate with a vote of 265,000.

Sen. Warren G. Magnuson, a public power supporter, was renominated by the Democrats with a vote of 400,000.

Both men were unopposed.

—EW—

At the AIEE Fall General Meeting, it was reported that 6-000,000 ft of aluminum sheathed cable are manufactured and installed. The cable is yet to be approved in the U. S. by NEC or Underwriters' labs.

—EW—

HELP—Hydraulic turbine manufacturers are appealing to their No. 1 customer, Uncle Sam, for protection from foreign competition. Because American workers get from 2½ to 12 times the pay of foreign employees, foreign firms consistently underbid domestic builders by 30, 40 and 50%.

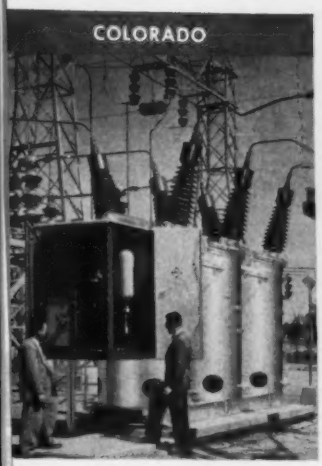
The turbine group asked that the government limit its procurement to American suppliers in order to preserve the defense potential of the hydraulic turbine industry.

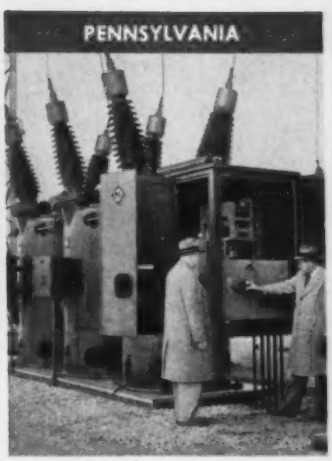
—EW—

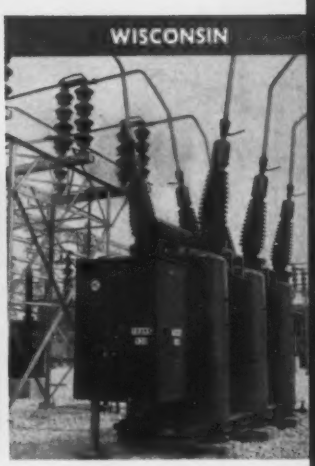
ATOMIC BY-PRODUCTS—Atoms for peace are moving faster than most people realize. The Atomic Industrial Forum Inc. has released figures showing that industry and agriculture already are saving up to $300,000,000 a year through the use of radio isotopes and predicted that savings will be more than a billion within 10 years.

More than a thousand industrial organizations are now using atomic energy by-product materials for such things as gaging, control, inspection and health protection in various forms.

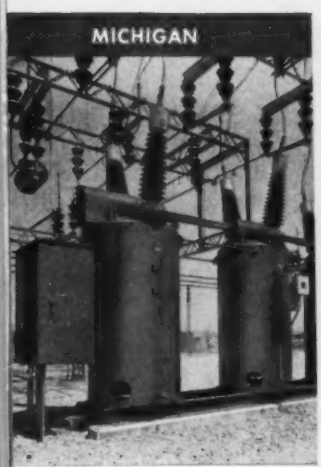
Utilities everywhere like Pneu-Draulic operators

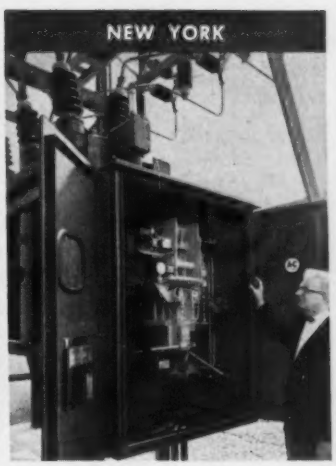


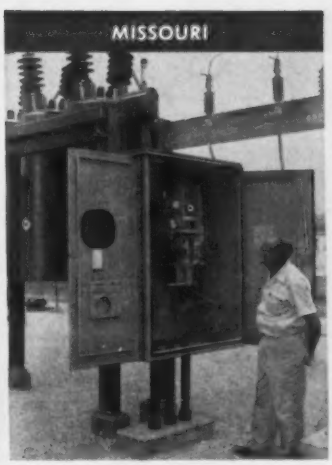


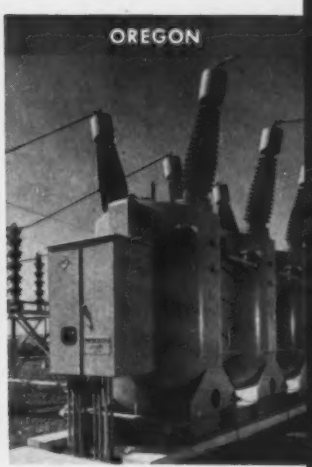


for their simplicity, reliability









***Pneu-Draulic* operators offer Utilities many advantages:**

- Simplicity — Compact design with few moving parts.
- Eliminates moisture, and corrosion problems — Entire system filled with oil containing inhibitor which eliminates rust, freezing and corrosion.
- Safe emergency closing — Breaker can be closed *safely* at full rated speed onto energized line even when no control power is available.
- Mechanically trip-free operation — Fully mechanically trip-free for complete system protection.
- Available on a wide range of breaker ratings — Breakers rated 500 mva and larger use the *Pneu-Draulic* operator as standard equipment.

Get details on these and other features of Allis-Chalmers breakers. Call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Pneu-Draulic is an Allis-Chalmers trademark.

A-5205

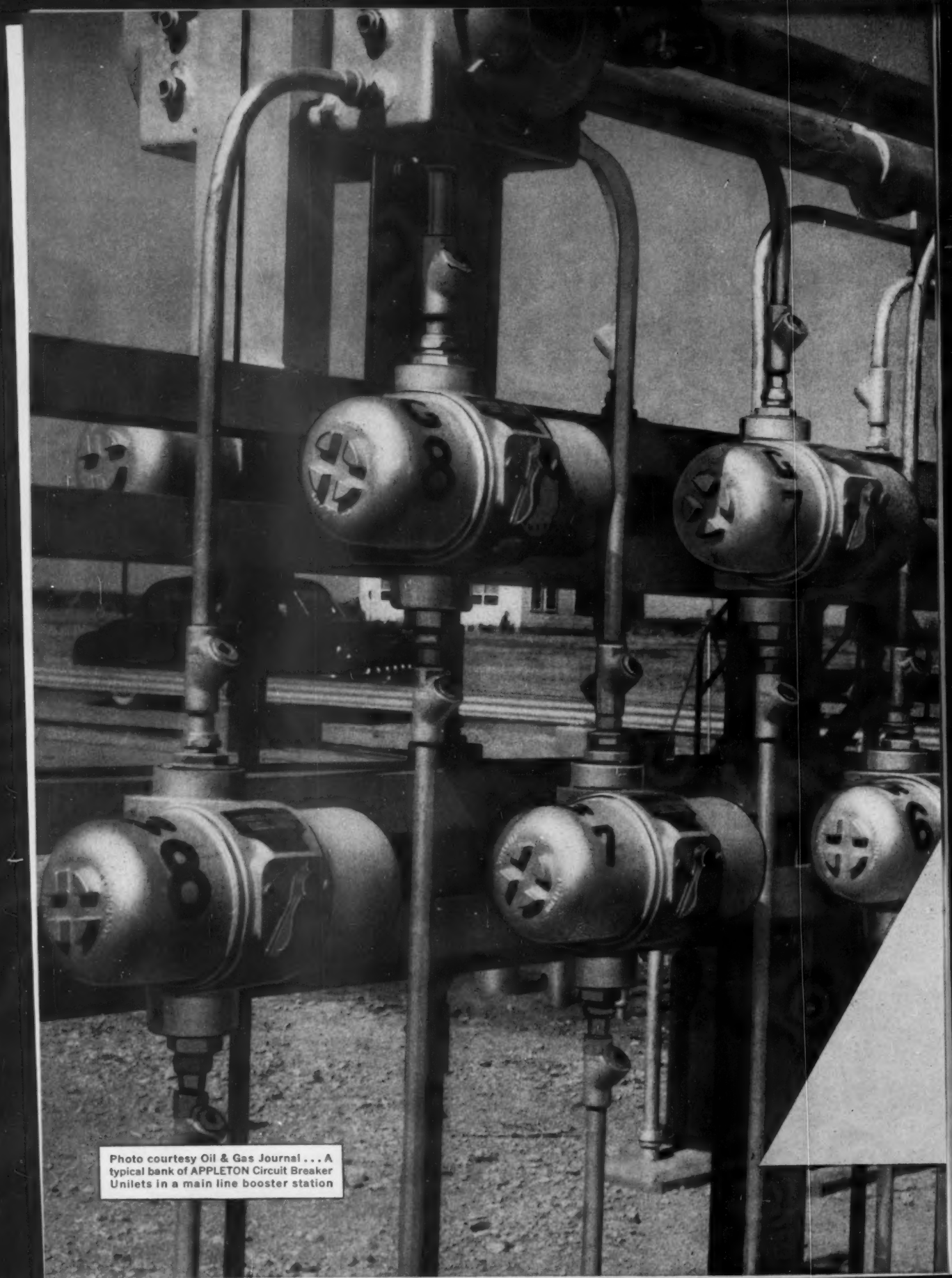


Photo courtesy Oil & Gas Journal . . . A typical bank of APPLETON Circuit Breaker Unilets in a main line booster station

The Choice of America's Leading Electrical Engineers

APPLETON

CIRCUIT BREAKER, MOTOR STARTER and COMBINATION MOTOR STARTER

UNILETS®

APPLETON Circuit Breaker and Motor Starter Unilets . . . your best choice for positive lasting protection against explosion, dust, and rain! Regardless of the installation, where absolute safety is required . . . APPLETON can serve you better!

7 REASONS FOR APPLETON SUPERIORITY
1. Full 7-thread explosion-proof protection. 2. Unmatched accessibility. 3. Compact, lightweight construction. 4. Unit may be added quickly, easily. 5. Flexible field set-ups with single and duplex male and female hub adapters. 6. Combinations meet U.L. requirements through approval of components. 7. First to be U.L. approved for banked circuit breaker grouping.

SOLD EXCLUSIVELY THROUGH SELECTED WHOLESALERS.
AN APPLETON ENGINEER WILL HELP YOU PLAN YOUR INSTALLATIONS WITHOUT OBLIGATION.

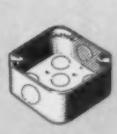
Also Manufacturers Of:

Explosion-Proof Fixtures

"ST" Series Connectors

Reflitas

Industrial Lights


Outlet Boxes

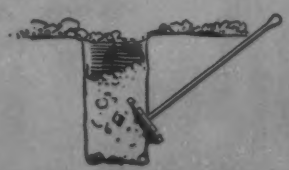
APPLETON ELECTRIC COMPANY • 1709 Wellington Avenue • Chicago 13, Illinois

APPLETON ELECTRIC PRODUCTS

Rely on APPLETON ... The Standard for Better Wiring®

CHANCE PLATE ANCHORS

We won't ask you to take a Mole's word for it, but you need to be a Mole to know what goes on below "see" level in an anchor installation unless the anchor fails or is pulled out in a test or dug out for examination. Chance Engineers and field technicians have installed and pull tested all kinds of anchors all over the country to see what happens when heavy loads are applied. And here are the anchors they and that well known subterranean anchor expert, Mike the Mole, recommended for heavy transmission line guying.



CHANCE
CROSS PLATE ANCHORS

Install in a single, vertical machine bored hole—drilled by the same bit used for boring pole holes. It installs in only half the time required to put down a log dead man—and will actually hold a much greater load ...70,000 pounds vs. 20,000 pounds for a creosoted log. (Test data on request.)

CHANCE NEVER-CREEP ANCHORS

When hole boring equipment can be used to drill holes at an angle—Choose the Never-Creep. It holds more "over the long pull" than any other type of anchor because it holds against solid earth in an inclined hole that is relatively unaffected by moisture seepage. Order these anchors from your Chance Distributor, or write A. B. Chance Company, Centralia, Missouri.

A·B·CHANCE CO·

ABC INDUSTRIES

CA56-13

ELECTRICAL BOOKS

EVALUATION OF INSULATING OILS — EUROPEAN DEVELOPMENTS, *78 pages, 6x9, American Society for Testing Materials, $1.75.*

European developments in the testing of transformer oils are discussed in three papers and discussion reporting research on the subject in France, Sweden and England. It is the sixth in a series of symposiums on insulating oils.

ELECTRICAL INTERFERENCE, *122 pages, 5x7, by A. P. Hale, Philosophical Library, $4.75.*

Electrical engineers and radio and television servicers will find this book useful in tracing and eliminating radio and television interference, whether it is to aid with designing electrical apparatus to prevent interference, or to find faulty receivers or installations.

POWER SYSTEM STABILITY, *322 pages, 6x9, by Edward Wilson Kimbark, John Wiley & Sons, $10.*

This third volume of the same title offers an up-to-date presentation of the theory of synchronous machines and their excitation systems. Discussing such effects as saliency, damping, saturation and high-speed excitation, it gives the reader a deeper understanding of power system stability than Vol. 1. All methods of calculation used are carefully explained, and many numerical examples are included.

PARTNERSHIP VS PUBLIC OWNERSHIP, *16 pages, 6x9, by Raymond Moley, Electric Utilities Public Information Program, 7c (6c for more than 100 copies).*

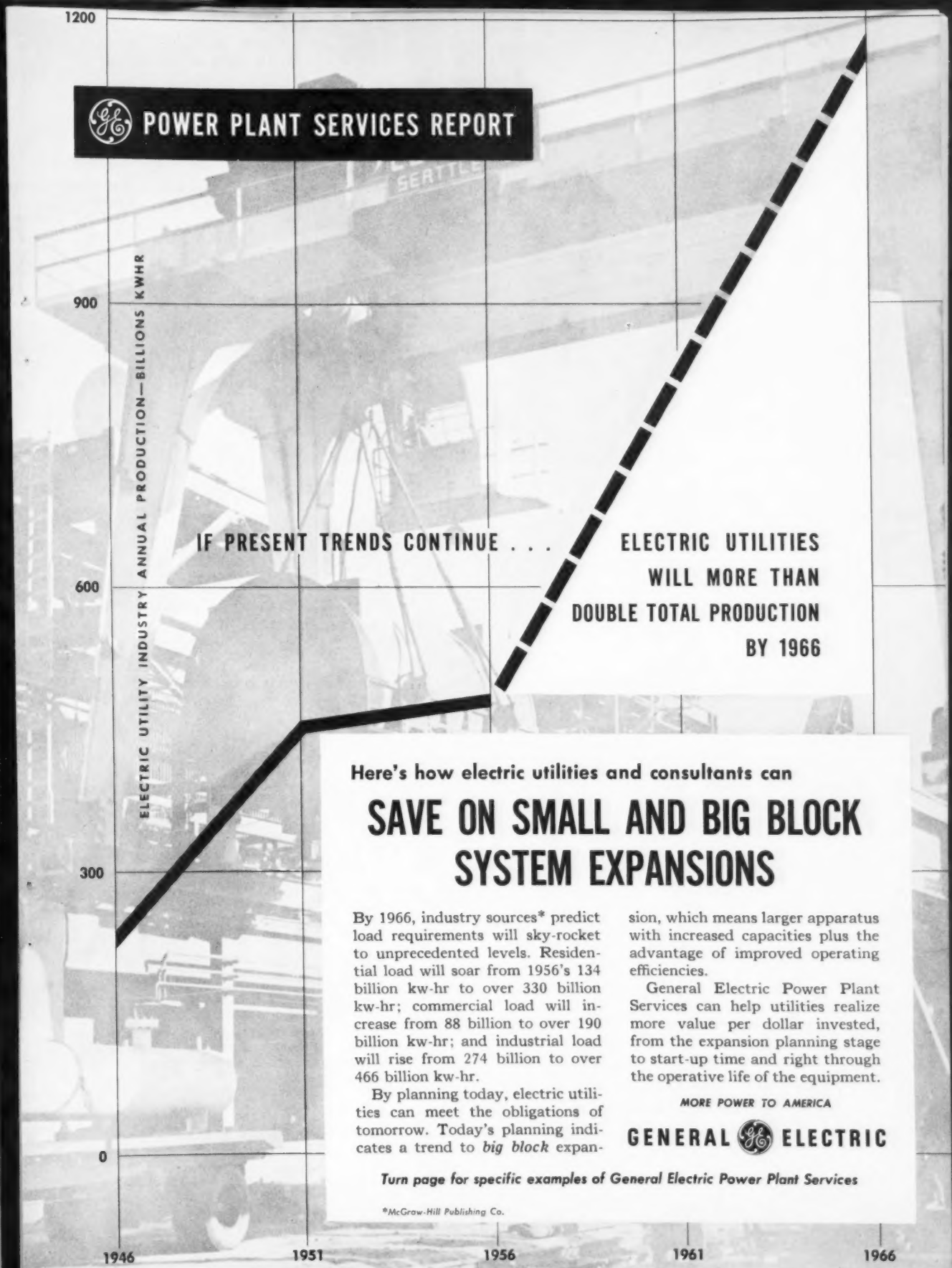
Prepared by *Newsweek* magazine, this booklet covers the partnership policy of the administration, preference, Niagara, Hells Canyon, atomic power and other topics. It is compiled from a series of *Newsweek* columns written by Raymond Moley, contributing editor.

ASTM STANDARDS ON METALLIC ELECTRICAL CONDUCTORS, *298 pages, 6x9, American Society for Testing Materials, $3.50.*

All of the ASTM standards pertaining to metallic electrical conductors are compiled in a compact form. Of the material included, there are 20 revised specifications and one new standard since the last edition.

CRITERIA FOR PROFESSIONAL EMPLOYMENT OF ENGINEERS, *23 pages, 6x9, National Society of Professional Engineers, 25c (quantity prices available).*

Copies of the employment practices criteria adopted by the National Society of Professional Engineers are printed in a check-list format, and cover specific categories of engineering career development. Suggested are the responsibilities of the employer to his professional employee and the latter's responsibilities to the employer. Topics included are recruitment, indoctrination, professional development of the individual, salaries, engineering titles, personnel practices and termination policies.



Here's how electric utilities and consultants can

SAVE ON SMALL AND BIG BLOCK SYSTEM EXPANSIONS

By 1966, industry sources* predict load requirements will sky-rocket to unprecedented levels. Residential load will soar from 1956's 134 billion kw-hr to over 330 billion kw-hr; commercial load will increase from 88 billion to over 190 billion kw-hr; and industrial load will rise from 274 billion to over 466 billion kw-hr.

By planning today, electric utilities can meet the obligations of tomorrow. Today's planning indicates a trend to *big block* expansion, which means larger apparatus with increased capacities plus the advantage of improved operating efficiencies.

General Electric Power Plant Services can help utilities realize more value per dollar invested, from the expansion planning stage to start-up time and right through the operative life of the equipment.

MORE POWER TO AMERICA

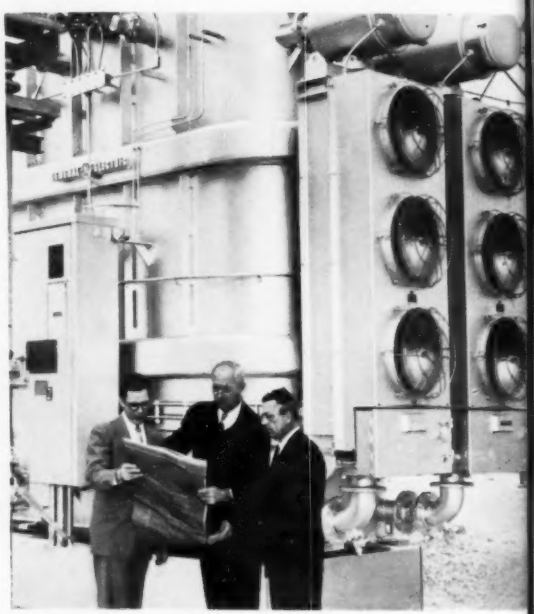
GENERAL ELECTRIC

Turn page for specific examples of General Electric Power Plant Services

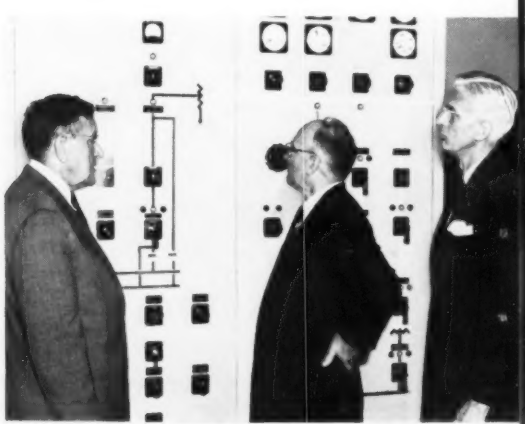
*McGraw-Hill Publishing Co.

Many electric utilities

Save valuable



FLORIDA POWER & LIGHT expanded by 231,000 kw, nameplate rating, with G-E equipment at Cutler station. L. H. Hill, Jr., G.E.; E. J. Pearch, Station Supt.; J. W. Lacy, Jr., G.E; note G.E.'s co-ordination of details on 42,500-kva FOA power transformer conserved engineering time.

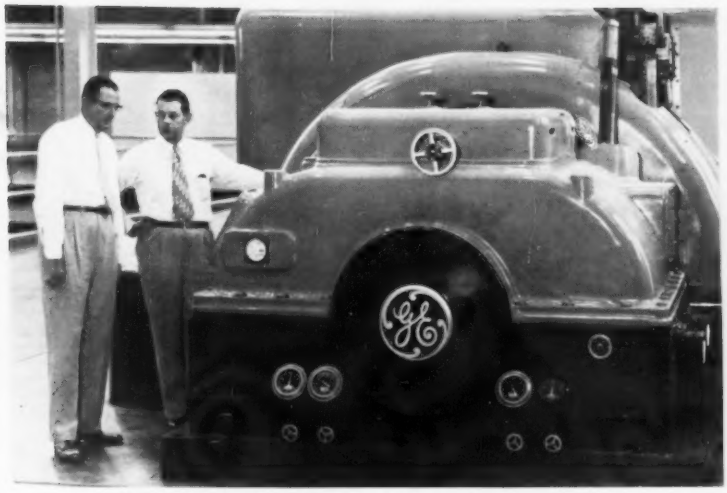


OKLAHOMA GAS & ELECTRIC stepped up capacity 20% with all-G.E. Arbuckle station. G.E.'s scheduling speeded construction, meant on-time start-up, as noted by L. Skog, Pres., Sargent & Lundy; W. B. Gesell, V. Pres., OG&E; C. H. Linder, G-E Vice Pres., at G-E master control panel.

PACIFIC GAS & ELECTRIC'S Pittsburg station produces 660,000-kw; G-E equipment includes 230-kv breakers. Left, J. Anderson, G.E.; K. Bausch, R. Stater, Bechtel (engrs. & constructors); G.E.'s J. D. Webster note how G-E Power Plant Services meant integrated equipment designs.

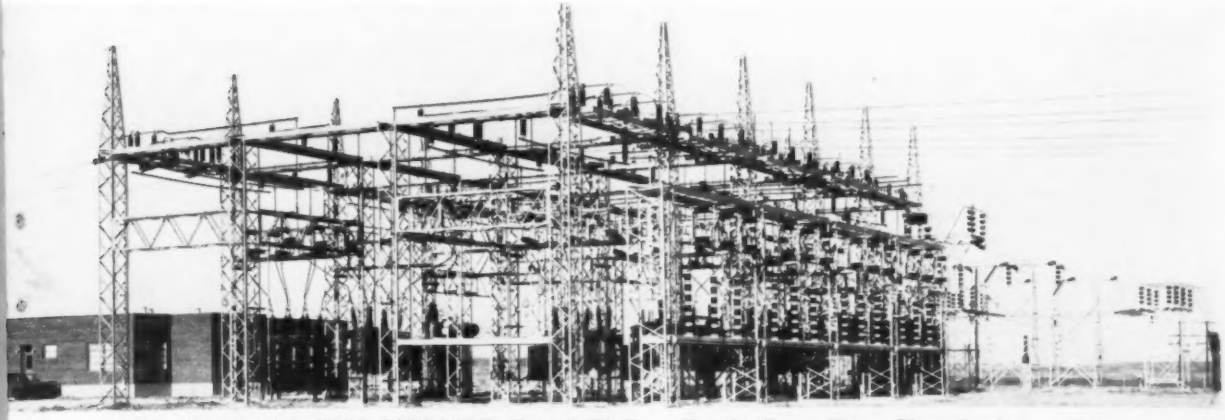
like these . . .

time, money and manhours with General Electric Power Plant Services



SOUTH CAROLINA ELECTRIC & GAS raised total capacity 20% with its 100,000 kw G-E turbine generator at the Urquhart Station. Above, General Electric's M.O. Troy, Jr. and F.R. McMeekin, Vice President of SCE&G, note that purchase of this third G-E unit plus other major electrical equipment simplified ordering of equipment, hastened start-up time.

MISSISSIPPI POWER & LIGHT'S all-G.E. 210,000-kw Delta steam plant was started up on schedule, G-E engineers trained operators to assure MP&L full operating knowledge of equipment, noted here by G.E.'s T. R. Brock, MP&L's D. C. Lutken.



IOWA POWER AND LIGHT COMPANY'S Council Bluffs steam station bolstered capacity by 44,000 kw. Installation help, including h-v switchyard shown here, speeded start-up.

For details on Power Plant Services, contact your G-E Apparatus Sales Representative or write Section 302-12, General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC

For more data on how G-E power plant services work for you, see next page ►

POWER PLANT SERVICES REPORT

These are the cost-saving power plant services on your job when you specify General Electric

APPLICATION ENGINEERING co-ordinates all items of electrical equipment in design, operation. Here, at model of Hartford Electric Light's 66,000-kw G-E equipped Middletown station, are G.E.'s F. C. Roberts, HELCO's J. C. Sonntag and K. L. Partridge; G.E.'s A. P. Wylie; and HELCO's S. Kusmik, D. C. Switzer and H. T. Barrows.

PRODUCT DEVELOPMENT gives you equipment incorporating latest design features. Above, Kansas City Power & Light Vice President J. A. Keeth, G.E.'s C. M. Sagmoen and H. S. Day discuss General Electric automatic dispatching equipment in operation on Kansas City Power & Light's system.

FIELD SERVICE ENGINEERING assures supervised installation, planned start-up. Above, Central Hudson Gas & Electric's Danskammer Point station unit No. 2 is discussed by G.E.'s C. B. Wilson; Ralph Roe, Pres., Burns & Roe; W. West, G.E.; R. B. MacGuinness, Vice Pres., CHG&E.

POWER PLANT CO-ORDINATION helped assure on-time manufacture, delivery of equipment at plant site of Indianapolis Power & Light's White River station. IP&L's Vice Pres. D. C. Hess, J. D. Blythe, President H. T. Pritchard, review delivery schedules with John Calder, G-E Sales Engineer.

SERVICE ENGINEERING helps keep plant operating at full capability. At Central Power & Light's G-E equipped 132,000-kw Lon C. Hill plant, G.E.'s R. M. Eichner reviews with Mark Lovelady, CP&L Vice Pres. and Chief Engineer, a planned equipment maintenance schedule.

MORE POWER TO AMERICA

GENERAL ELECTRIC

LIVE BETTER ELECTRICALLY

Wire sculpture by Henry Szafarz

The Inside Story

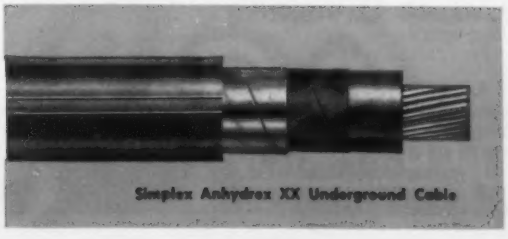
Beneath the surface, there's a lot going on.

An underground river of power surges through innumerable cables, supplying the electrical energy that keeps the entire community rolling smoothly.

Throughout the nation, Simplex products are used extensively in such applications. This is particularly true of ANHYDREX XX, the ideal all-purpose cable for high-voltage use. This expertly engineered cable is popularly employed in the 2001 to 35,000 volt range, and has a Conductor Temperature Rating of 90°C up to 5 KV (a rating never attained before the development of ANHYDREX XX).

For more technical data, write for Booklet 1023.

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

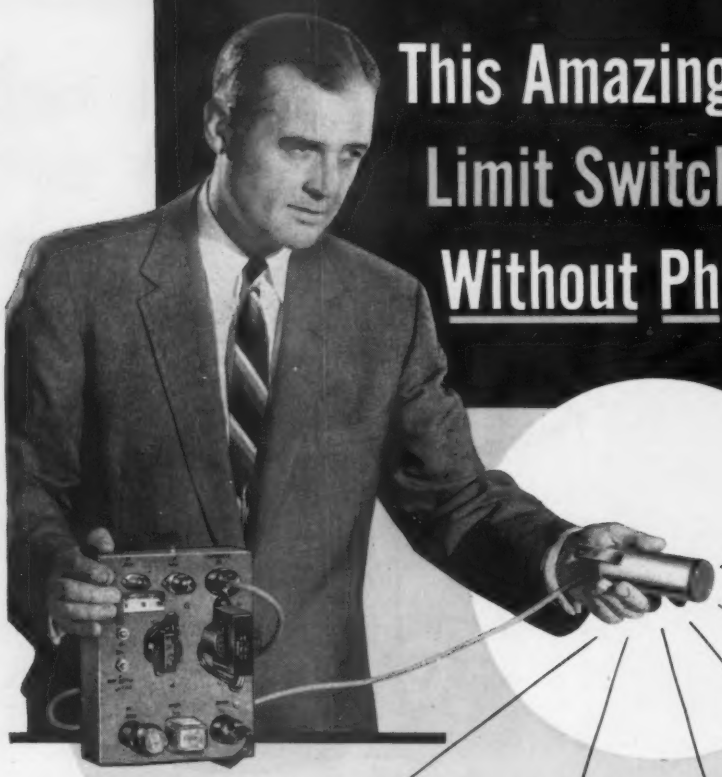


Simplex Anhydrex XX Underground Cable

Simplex

LIVE BETTER ELECTRICALLY

This Amazing New Limit Switch Operates Without Physical Contact!



Transducer (sensing head) is actuated by presence of magnetic materials over a wide range of sizes, shapes, weights, roughness, speeds

No moving parts. No metal-to-metal contact required for operation

Sensitivity up to 1 inch

Can be mounted in any position. Not affected by vibration

Small size (1⅞" x 6") Fits into tight spots

Non-magnetic material between the part and transducer does not affect operation

• Here's an entirely new concept in industrial limit switches! We've named it the **PROXIMITY LIMIT SWITCH** because it is actuated by the nearness of ferrous parts or materials. Since its operation requires no physical contact, it has unlimited applications in places where the use of conventional limit switches is either impractical or impossible! Its range of application is broadened, too, because the transducer (sensing head) is not affected by vibration or by the presence of non-magnetic material.

In paint spray systems, on production line presses, multiple process machines, heavy automation equipment—there are literally scores of places where this amazing new PROXIMITY SWITCH will do the job better!

ASK YOUR SQUARE D FIELD ENGINEER FOR A DEMONSTRATION. OR WRITE FOR PROXIMITY LIMIT SWITCH BULLETIN. ADDRESS SQUARE D COMPANY, 4041 NORTH RICHARDS STREET, MILWAUKEE 12, WISCONSIN

***NOW...EC&M* PRODUCTS ARE A PART OF THE SQUARE D LINE!**

SQUARE D COMPANY

The display windows of John M. Smyth Company, Chicago, one of the nation's finest home furnishing stores, demanded glare-free lighting in their large display windows to attract attention . . . create atmosphere . . . permit immediate appraisal. To provide the necessary high levels of glare-free illumination, Architect L. R. Sumnarhoff chose the attractive and functional Electro Silv-A-King Louver-all Ceiling.

Equally important was the choice of ADVANCE Fluorescent Lamp Ballasts to serve as *Silent Partner* . . . as the *heart* of this efficient lighting system. High lighting efficiency, trouble-free operation, and peak performance, prime requisites of any lighting installation, are guaranteed by the selection of ADVANCE Fluorescent Lamp Ballasts.

Continuing research and constant new developments by the ADVANCE TRANSFORMER COMPANY have made possible the introduction of many new ballasts with exclusive patented features. Thus, ADVANCE provides lighting equipment manufacturers, designers, architects, engineers, contractors and other fluorescent lamp ballast users with the world's most extensive line of fluorescent lamp ballasts. When you use ADVANCE, there is a ballast for every specific purpose, never a need to compromise.

For anyone who manufactures, specifies, installs or uses fluorescent lighting, ADVANCE TRANSFORMER COMPANY has prepared helpful literature which will be sent on request without obligation. Write today.

The Heart of the Lighting Industry

ADVANCE

CBM CERTIFIED

World's Largest Exclusive Manufacturer of Fluorescent Lamp Ballasts

TRANSFORMER CO.

2950 NO. WESTERN AVE. CHICAGO 18, ILL. U.S.A.

NOW... LOADBUSTER

Breaks Loads with Open Cutouts

LOADBUSTER is ruggedly built for repetitive service with S&C open cutouts wherever they are applied. There is no broken link to replace after switching. Both the cutout and LOADBUSTER are ready immediately for repeat service. Moreover, the high interrupting capability of LOADBUSTER permits load breaking even when the cutout carries the 200 ampere disconnect blade. Also, it can interrupt any steady overload the cutout may be carrying (as much as 200 amperes with a 100 ampere link).

- **Put LOADBUSTER on each of your line trucks**
- **With it your lineman is ready to break the circuit instantly up and down your distribution system**
- **It just hooks across an S&C disconnect or S&C open-type cutout to provide safe, arc-free interruption**

....A *Portable* LOADBREAK TOOL

With the advent of the revolutionary LOADBUSTER, an entirely new concept in circuit switching is born, one that brings complete, positive, safe switching for distribution systems within the reach of any utility's pocketbook. For LOADBUSTER is a circuit interrupting device which is portable, is repetitive, and is universal.

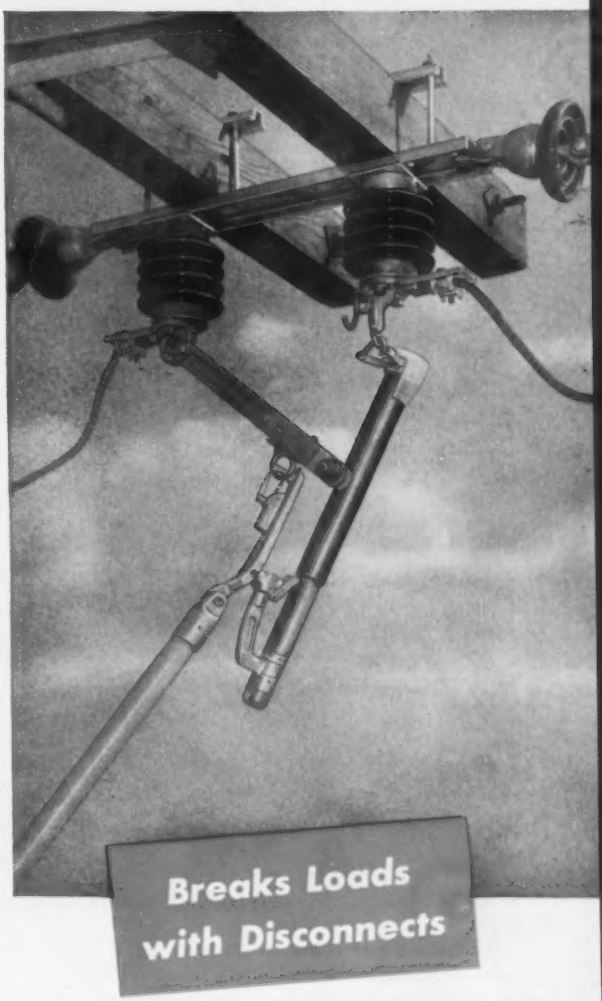
Disconnects and cutouts inherently have no positive switching capability. To get it, some interrupting means must be built into them. For example, a link breaking device must be built into an open cutout; an interrupting unit into a disconnect which then makes it a load interrupter switch. This costs money !!! BUT, bringing the interrupting device to the disconnect or cutout only when needed eliminates this cost . . . that's what LOADBUSTER does . . . it's a loadbreak tool.

With LOADBUSTER you can drop all tedious, uneconomical, and unsafe switching practices. Attached readily to a universal pole, LOADBUSTER is simply hooked across the upper contact of a disconnect or cutout which is then opened in the normal way. It's just that easy! There's no arc, no link breakage, no fuss, no worry, no contact burning, and no danger to the operator. After use, LOADBUSTER is returned to the truck ready for instant use again anywhere.

LOADBUSTER can be used over and over again. It will withstand daily field usage over a long period of time without requiring maintenance. On the other hand, because it's portable, it's available for easy inspection. It's a circuit interrupting device that can always be kept in top-notch condition.

LOADBUSTER is operable at any distribution system voltage through 14,400 volts, and is able to break all load currents through 400 amperes, as well as associated magnetizing and charging currents. It can also switch all pole-top capacitor banks.

Ask for Descriptive Bulletin No. 730.



LOADBUSTER provides arc-free circuit interruption with S&C disconnects rated 400 amperes and 14.4 kv. It also will be usable with an S&C pole-top regulator switch.

S&C

Specialists in High-Voltage Circuit Interruption since 1910

S&C ELECTRIC COMPANY

4425 RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS, U. S. A.

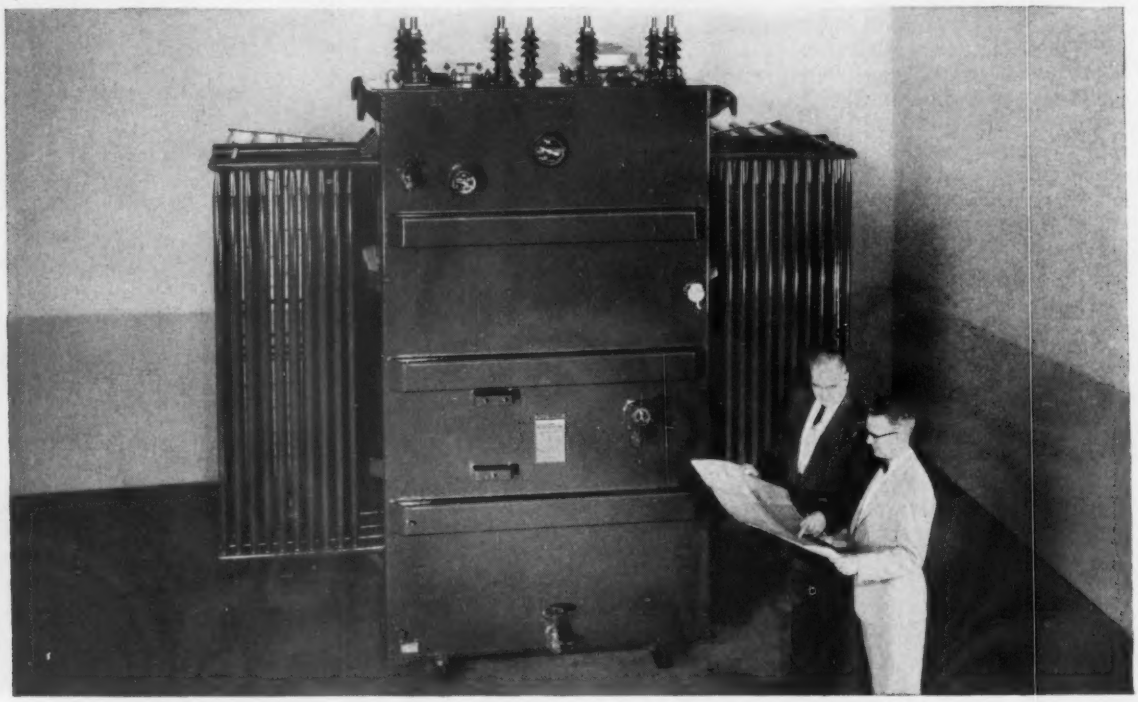
In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario

POWER FUSES • CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

Design time... five minutes

WESTINGHOUSE ENGINEERS are now designing mathematically perfect power transformers with new IBM-705 electronic computers . . . in minutes.

J. C. Rissinger, Manager Substation Equipment Sales, reviews design improvements with Gordon Monroe, Section Mgr., Engineering Department . . . many made possible by freeing engineers from routine design calculations.



Automation has come to transformer design. Two new Westinghouse computers telescope design time to just short of nothing. That's important because designing a well-balanced transformer has been a complex and time-consuming job. Now, such factors as impedance, losses, sound level, temperature rise and dielectric strength are all integrated into product design—automatically, literally in 5 minutes.

The exclusive application of this Westinghouse pioneered innovation to the complete design of power transformers means products of mathematically perfect quality.

Specification and purchasing are simpler. Exact design information is right on hand at the time the order is negotiated. Eliminating 99% of our design time means you get faster delivery.

The time of, literally, dozens of engineers is being made available for creative development work on new and better transformers. Even when product performance already represents industry leadership, you can depend on Westinghouse to introduce new ideas that make any Westinghouse transformer a better buy.

Get in touch with your Westinghouse sales engineer, today, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70767-X

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

Redege Benfield Bender used in demonstration

We had lost the order . . .

then our salesman started bending pipe

We had lost a big order on price—almost. Then our salesman got mad. He decided to *prove* that Sherarduct rigid steel conduit should be specified. So he went out and picked up a bender and some lengths of Sherarduct. Back in the customer's office he started making bends . . . then the customer tried a few himself.

Result: we got the order. The customer didn't need an adding machine to figure out the savings in labor he'd get from Sherarduct's easy bending qualities.

Easy bending is one reason Sherarduct is preferred by so many cost-conscious contractors. There are others, like easy fishing, lifetime protection against corrosion, zinc protected threads, strong couplings and thorough grounding. They're features that add up to why Sherarduct is galvanized conduit at its best.

Next time an NE salesman calls, give him a chance to prove Sherarduct—by actually bending some pipe.

Meantime, write for our Sherarduct facts book and get complete information on the Sherardizing process of dry galvanizing that actually alloys zinc with the steel wall of the conduit.

Sherardizing is galvanizing at its best . . . Sherarduct is galvanized conduit at its best

Listed by Underwriters' Laboratories, Inc.

National Electric Products

TORRANCE, CALIFORNIA

Branch Offices: San Francisco • Seattle • Denver
Los Angeles • Salt Lake City • Portland • Phoenix

NOW!

3 new SCOTCHCAST BRAND kits for cable splicing!

Reg. U.S. Pat. Off.

Here is everything you need to make a splice and insulate it on any single-conductor cable up to 600,000 CM . . . quickly, easily with "factory-tight" efficiency – and it's all in kit form!

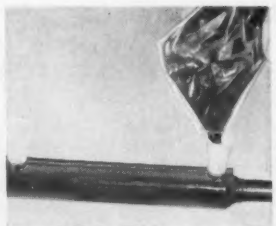
The new "SCOTCHCAST" Brand 82-A1, A2 and A3 kits (for different sized straight-line splices) and 90-B1 kit (for wye and tap splices) utilize "SCOTCHCAST" Resin No. 4 in the famous ready-to-use "Unipak" container. "SCOTCHCAST" Resin effectively blocks all possible moisture entry points; gives you maximum insulation and protection against mechanical and electrical stresses on every splice.

All materials for this revolutionary non-technical splicing method are included in the "SCOTCHCAST" kit. SEND FOR NEW FREE BOOKLET describing the "SCOTCHCAST" kits in detail. Just write on your letterhead to Minnesota Mining and Manufacturing Company, St. Paul 6, Minnesota, Dept. BU-116 Do it today!

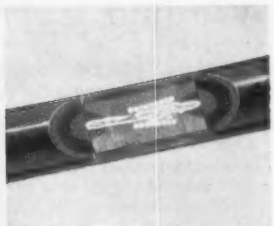
Three easy steps...and a completed splice!

1 Cable is spliced and mold-halves are assembled over splice area. Kit contains all necessary materials.

2 Remove "Unipak" container from foil envelope; squeeze the bag to activate the "SCOTCHCAST" Resin.



3 Pour activated "SCOTCHCAST" into mold, using pouring spouts supplied with kit. Resin begins to set immediately.



4 Cut-away photo shows how tightly splice is sealed – the "SCOTCHCAST" way – against any moisture penetration.

The term "SCOTCHCAST" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P. O. Box 757, London, Ontario.

3M COMPANY

If high-resistance grounds are causing you problems, here's a simple, low-cost way to solve them. Drive Copperweld* Sectional Ground Rods deep into the earth's sub-surface to reach permanent moisture, where resistance is always low.

By using this proved, practical method, you'll have dependable grounding protection every day in the year. And then you can be certain you'll always get the best performance from the protective equipment on your overhead systems.

*Trade Mark

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

GO DEEP with Copperweld TRADE MARK **sectional ground rods**

DISTRIBUTION TRANSFORMERS

THIS CONNECTOR

COULD SAVE YOU...$60

Estimate your possible savings in terms of all transformers on your lines

It's an old story to many utilities—customer complaints about radio or TV interference. And it's an expensive story, too—at an average of $30 a service trip. In fact, it often takes a couple of calls—for a total of $60—before the real villain is revealed. That villain is "cold-flow"—the tendency of aluminum to yield causing loose connections. A little multiplication of the number of transformers on your lines will prove that "cold-flow" can be a costly nuisance.

G-E connectors save you those service trips. G-E connectors counteract "cold-flow" of aluminum conductors, give an extra-tight grip on copper conductors. Low-voltage bushings have two coned-disk stainless steel washers which automatically maintain high pressure. High-voltage, tank-wall bushings achieve the same result with an internal, stainless steel follow-up spring.

Even if you don't use aluminum conductor, you still want assurance of tight connections. The new G-E connectors can save costly service calls.

Look at the other money-saving features offered by G-E distribution transformers: **Impulse testing** saves years of transformer life. **One-piece clamping bands** save maintenance time. Reusable **Nitrile rubber gaskets** help save units from contamination. **Strenicor terminal clamps** save terminals from breaking. **Super Melaglyp paint** saves up to two repaintings. **Nationwide warehouses** save utilities heavy inventory expense. **Service shops** can cut your repair and rebuilding costs.

For the complete story contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to General Electric Company, Section 431-39, Schenectady 5, New York.

dollar-saving features prove ATANA*

***ALL TRANSFORMERS ARE NOT ALIKE**
(make this simple comparison and see)

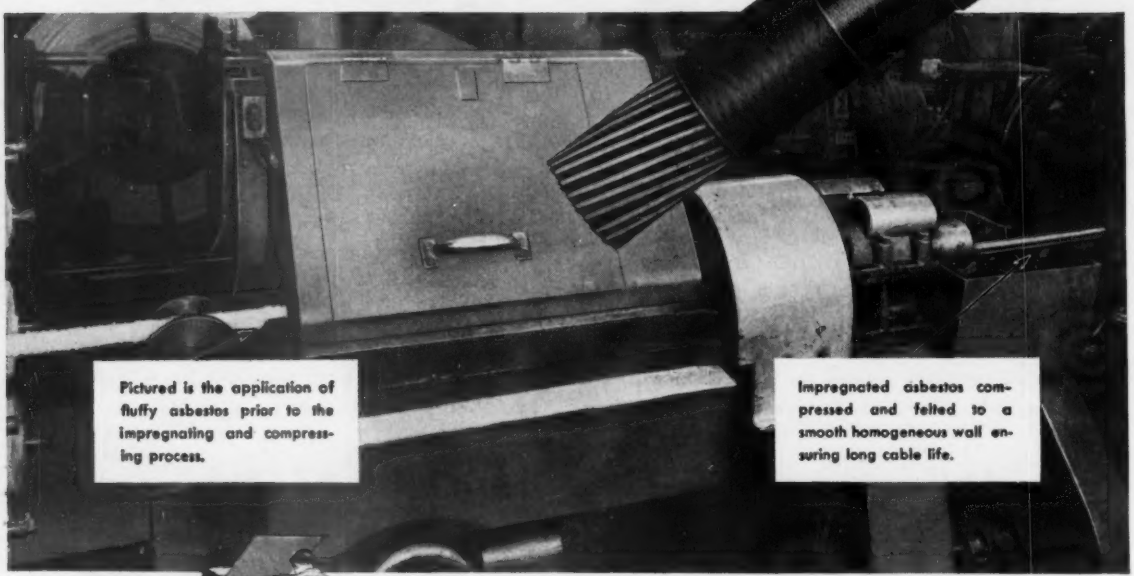
FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	√			√		√
Nitrile rubber gaskets	√					√
One-piece clamping band	√					
H-v and l-v terminals handle both copper and aluminum conductors	√					
Strenicor pressure terminal clamps	√					
Super Melaglyp paint	√					
More than 100 warehouses	√	√				
Nationwide, company-operated service shops	√	√				

Progress Is Our Most Important Product

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

SELECTED COMPOUNDS
in felted asbestos walls
+ quality varnished cambric tapes
add up to
ROCKBESTOS A.V.C.
(N.E.C. TYPE AVA) QUALITY



Pictured is the application of fluffy asbestos prior to the impregnating and compressing process.

Impregnated asbestos compressed and felted to a smooth homogeneous wall ensuring long cable life.

Compounds — specially selected compounds — which are used to impregnate asbestos walls, are one of the important reasons why you can count on Rockbestos A.V.C. for dependable, long lasting service.

For this impregnation, Rockbestos engineers not only set up rigid compound specifications but conduct a continuing testing program to insure that these standards are always met. Thus, the exactly right compound is applied to the asbestos wall at the correct temperature and at the correct pressure. *The Result . . . the seamless, felted Rockbestos wall.*

In Rockbestos A.V.C. impregnated felted asbestos walls seal varnished cambric tapes away from air and moisture. The tapes are made to Rockbestos specifications and are applied under controlled methods assuring uniform dielectric strength.

Rockbestos A.V.C. gives you long life and dependable service under every type of operating condition . . . in temperatures up to 230°F.

Complete construction and test specifications of Rockbestos A.V.C. are in the new booklet "Specification RSS-88". Write today for your copy.

ROCKBESTOS PRODUCTS CORP.
NEW HAVEN 4, CONNECTICUT

NEW YORK • CLEVELAND • DETROIT • CHICAGO • PITTSBURGH • ST. LOUIS
LOS ANGELES • NEW ORLEANS • OAKLAND, CALIFORNIA • SEATTLE

STOCKED COAST TO COAST
Standard Rockbestos A.V.C. construction (N.E.C. types AVA, AVB, etc.) are available for immediate shipment. Call or write nearest branch office.

Sikorsky Aircraft's "Plant of the Year"

WIRE BY PHELPS DODGE

This spacious new helicopter plant recently built by Sikorsky Aircraft, division of United Aircraft Corporation in Stratford, Conn., covers nearly 18 acres and can easily be expanded to meet future production needs. A model plant in every respect, it has been cited by *Factory Management & Maintenance* as one of the top ten in the nation for 1956.

One of the requirements for this outstanding Sikorsky plant was an electrical system of the highest quality. That's why Phelps Dodge building wire and cable were installed.

On every wiring job where top-quality performance, expert workmanship and experienced "know-how" are called for, *it pays to rely on Phelps Dodge and your Phelps Dodge distributor!*

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Fort Wayne, Greensboro, N. C., Houston, Jacksonville, Kansas City, Mo., Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

I-T-E CURRENT-LIMITING "CORDON" Circuit Breakers

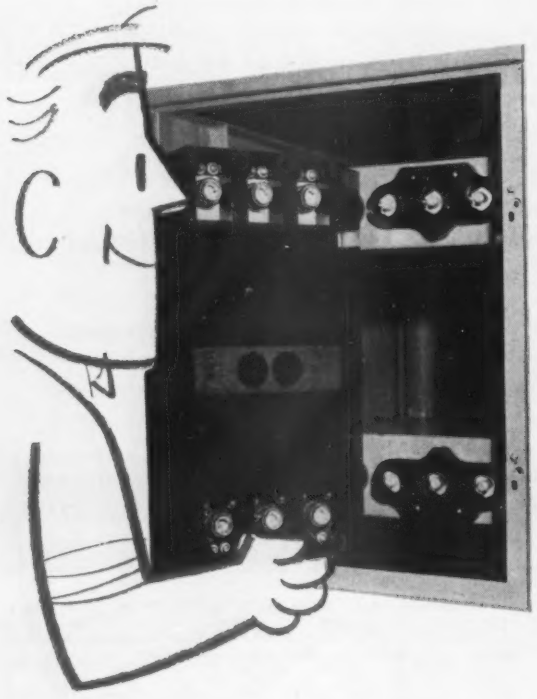
limit short circuit currents of high magnitude to a fraction of their possible value

"Cordon" Circuit Breakers combine current-limiting Amp-Traps* with standard thermal-magnetic molded case circuit breakers in a compact, integral design. They safely protect circuits where fault currents may reach 100,000 rms amperes, and also protect against sustained overloads and low magnitude short circuits. These current-limiting circuit breakers are now available as follows:

- A complete line—four frame sizes, 100, 225, 400 and 600 amp; 250 v d-c, 600 v a-c—with interrupting rating of 100,000 rms amperes
- With NEMA 1A and NEMA 12 enclosures
- With plug-in mounting for switchboard applications

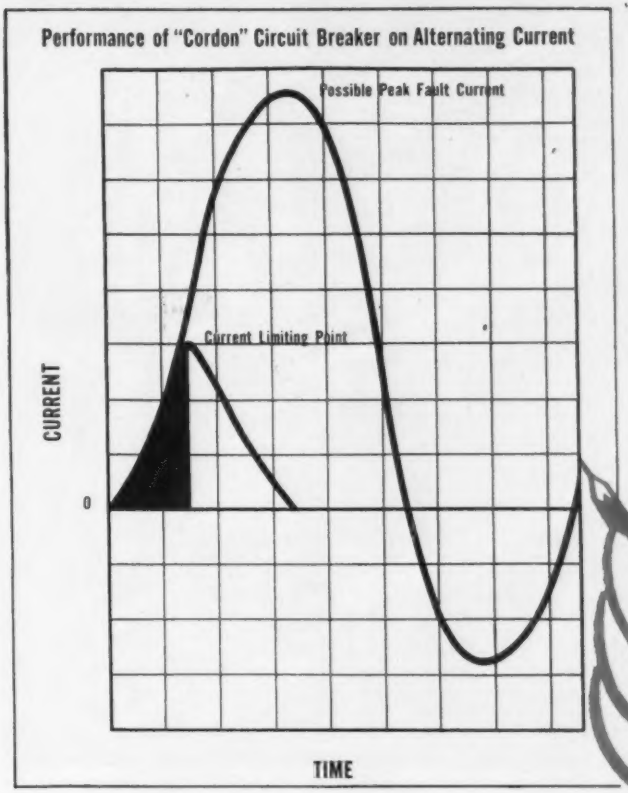
For complete information, contact your I-T-E representative. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

**Amp-Trap is a registered trade-mark of the Chase-Shawmut Co.*

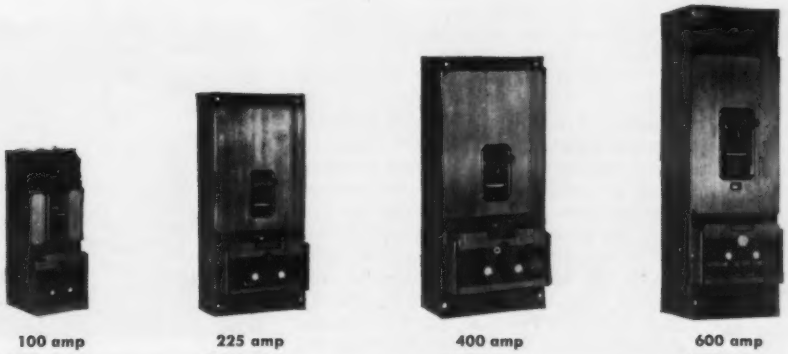


NEMA 1A AND NEMA 12 ENCLOSURES for housing "Cordon" Circuit Breakers are available.

FLEXIBILITY WITH PLUG-IN MOUNTING. Withdraw the breaker, insert another of the same frame size with the desired continuous ampere rating. No wiring changes. All "Cordon" Circuit Breakers can be supplied with plug-in mounting arrangement.



100,000 RMS AMPERE PROTECTION. On a circuit where a 100,000 rms ampere fault current is possible, the peak current could rise to approximately 190,000 amperes. With a "Cordon" in the circuit, the peak current is limited to a fraction of its possible value. The speed of the current-limiting Amp-Traps prevents the current from flowing long enough to reach the first peak. Since the "Cordon" Circuit Breaker limits both the magnitude and duration of the short circuit current, magnetic and thermal stresses on circuit components are materially reduced.



100 amp "CF" Frame | 225 amp "CK" Frame | 400 amp "CKL" Frame | 600 amp "CL" Frame

A COMPLETE LINE OF "CORDON" CIRCUIT BREAKERS from 15 to 600 amp, 250 v d-c, 600 v a-c

I-T-E CIRCUIT BREAKER COMPANY

Small Air Circuit Breaker Division

◀ **Coil being driven into slots.** Tight fit shows importance of accurate tolerances and dimensional stability.

▲ **Quinterra Type 5—2 ply** is here being applied to the flat section of armature coil to form basic cell insulation. For abrasion resistance, a wrapping of untreated glass tape is applied over the Quinterra before final varnish dip and hot press cure.

Why West Virginia Armature Co. switched to J-M QUINTERRA® for armature coil insulation

West Virginia Armature Co., Bluefield, W. Va., is a leading manufacturer of motor armature coils, used by the coal mining industry—a severe and difficult field. It was only after 4 years of field testing that they decided to change to Johns-Manville Quinterra Type 5 —2 ply from their traditional built-up insulation materials. They made this change because they discovered that:

1 Quinterra retains higher inherent dielectric strength under prolonged high temperature operating conditions.

2 Quinterra, manufactured to closer thickness tolerances, permits more accurately dimensioned coils, assuring easy and proper fit.

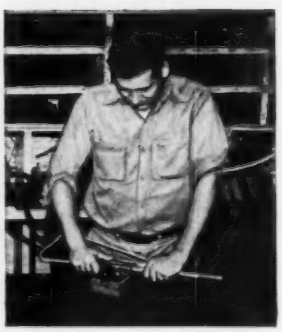
3 Quinterra is pliable, conforms readily to shape of coil and remains dimensionally stable in storage or in use.

4 Quinterra is smooth, does not crack or flake, is easy and pleasant to handle, does not harm or irritate operators' hands.

5 Quinterra is flexible, eliminates dielectric failures due to flaking or splitting.

Quinterra Type 5—2 ply is made from two sheets of highly purified asbestos treated with a polyvinyl acetate resin saturant combined under controlled temperature and pressure. It has ample mechanical strength for easy handling. Its inherent dielectric strength exceeds 280 VPM even at temperatures over 130°C.

Find out how you can obtain the same benefits from Quinterra. Write for free 32-page illustrated brochure, EL-40A. Address Johns-Manville, 116 New Montgomery St., San Francisco 5, Calif. In Canada, Port Credit (Toronto), Ontario.



Dimensional accuracy is imperative. Here, finished coils are being tested in Go-or-No-Go gauge.

Sold in the West by Electrical Specialty Co.

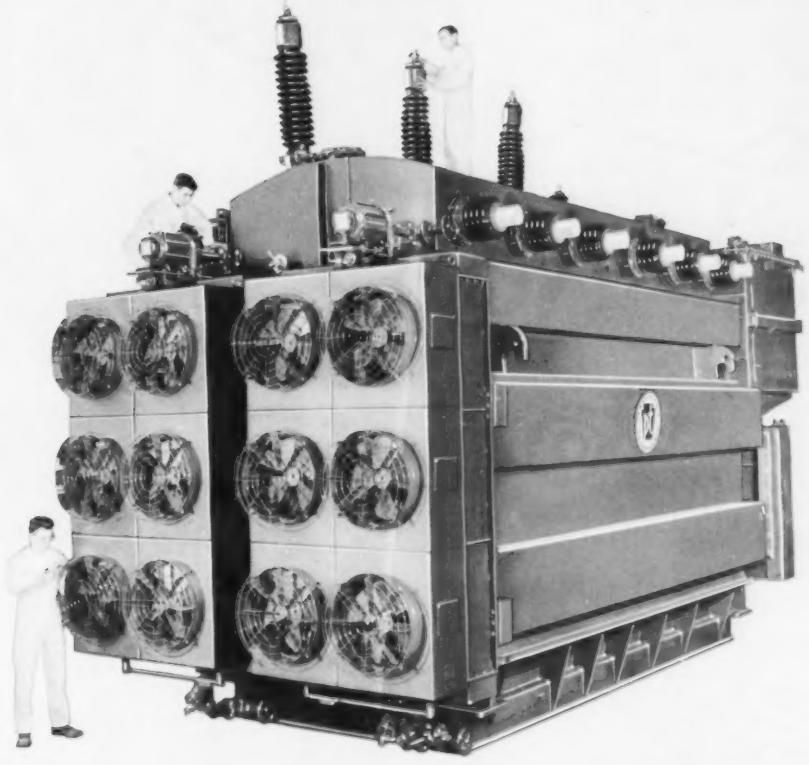
2820 East 12th St. Los Angeles 23, Calif. | 158-168 Eleventh St. San Francisco 3, Calif. | 2406 First Ave., S. Seattle 4, Wash. | 1101 Stout St. Denver 4, Colo.

Johns-Manville ELECTRICAL INSULATIONS

Pennsylvania **260,000 Kva** contour design shell form

MAIN STEP-UP

Generating Station Transformer



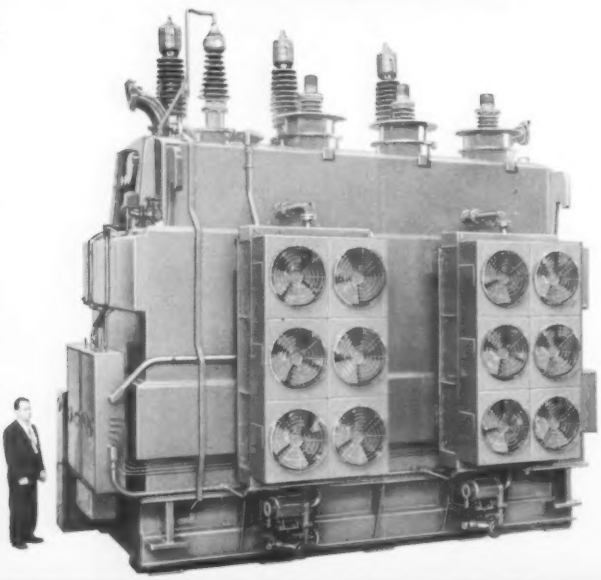
designed and built for upright shipment in one piece

This large three-phase, main step-up generating station transformer was designed and manufactured by Pennsylvania for a midwestern utility. The transformer will step-up a generated voltage of 15,000 volts to a transmission voltage of 141,000 volts. Two low voltage sections of 15,000 volts are rated at 130,000 kva each. Six of Pennsylvania's own Sealmaster Pumps circulate oil through the core and coils and through six coolers. Contour in design, so therefore compact in size, the transformer (less coolers and bushings) was shipped upright in one piece on a depressed center car. A duplicate unit is on order for the same company.

PENNSYLVANIA TRANSFORMER COMPANY
A McGraw Electric Company Division **CANONSBURG, PA.** Greater Pittsburgh District

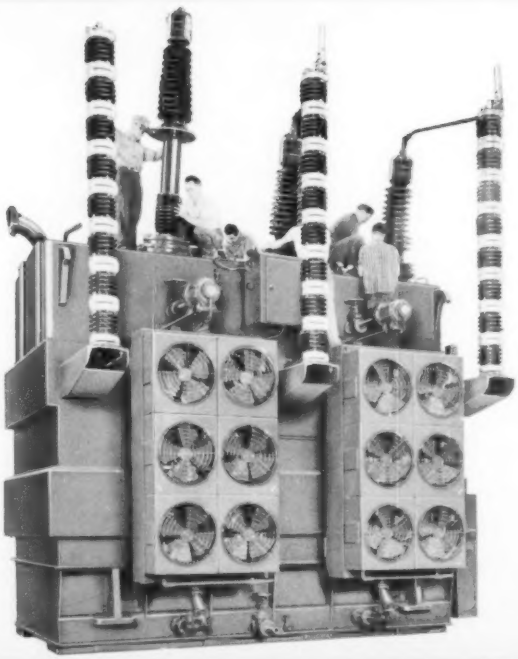
Pioneer in 1-piece upright shipment of large Power Transformers

Main Step-up GENERATING



175,000 Kva

High Voltage: 115,500 Grd. Y volts
Low Voltage: 17,500 Delta volts
Oil-immersed, forced-oil-cooled with forced-air cooler



140,000 Kva

High Voltage: 115,000 Grd. Y volts
Low Voltage: 14,700 Delta Volts
Oil-immersed, forced-oil-cooled with forced-air-cooler

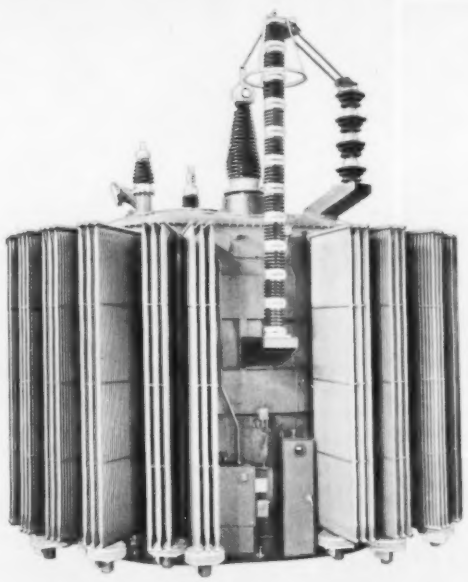
STATION AUXILIARY

Transformers

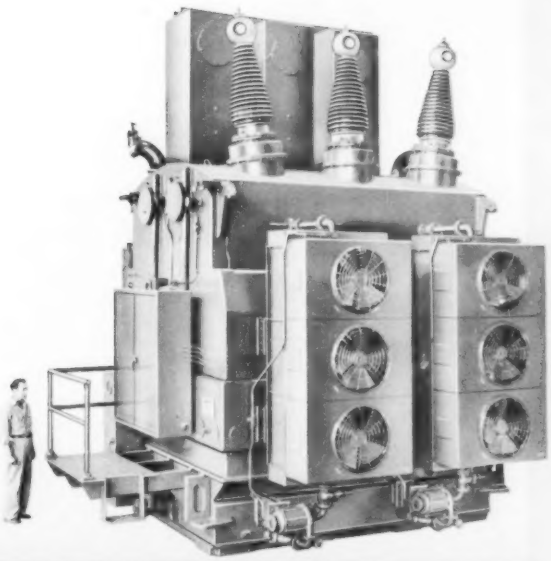
2000 Kva Silicone-Insulated Dry-Type Transformer

Just as Pennsylvania led the way in one-piece shipment of large power transformers, the company also pioneered the development of silicone-insulated units — the fire- and explosion-resistant transformers that are safest of all for both indoor and outdoor installations.

The 2000 kva station auxiliary transformer pictured is a sealed-in nitrogen, dry-type unit; three phase, 60 cycles, 150°C. temperature rise; 2400Δ–480Δ volts.



STATION TRANSFORMERS by PENNSYLVANIA



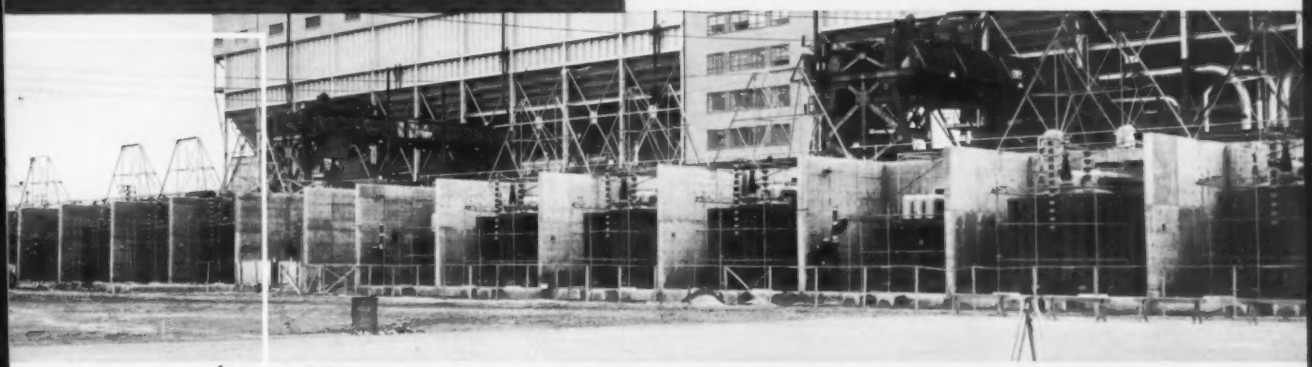
120,000 Kva

High Voltage: 145,000 Grd. Y volts
Low Voltage: 19,800 Delta Volts
Oil-immersed, forced-oil-cooled with forced-air cooler

From the standpoint of kva capacity, the three main step-up transformers pictured at the left can be classified as "large." They range in ratings from 120,000 kva to 175,000 kva. In physical size, however, their dimensions and weights were kept well within the limits for one-piece, upright shipment. This was possible because of the compact characteristics of Pennsylvania's own "contour design," shell form construction.

The units traveled to their respective installation sites in an upright position, with only bushings, cooling equipment and certain accessories removed. This meant easier handling in the field, with greatly reduced installation time and costs.

As the pioneer of one-piece upright shipment of large power transformers, Pennsylvania has long been offering this time-saving, cost-cutting advantage with core form transformers also.



These 19 56,000/70,000 kva main step-up generating station transformers, of core form design, were shipped to their destination in an upright position, completely assembled except for bushings and detachable radiators. Of single-phase construction, these transformers have a high voltage rating of 93,000/161,000 Grd. Y volts with a low voltage rating of 19,000 volts.

PENNSYLVANIA TRANSFORMER COMPANY
A McGraw Electric Company Division **CANONSBURG, PA.** Greater Pittsburgh District

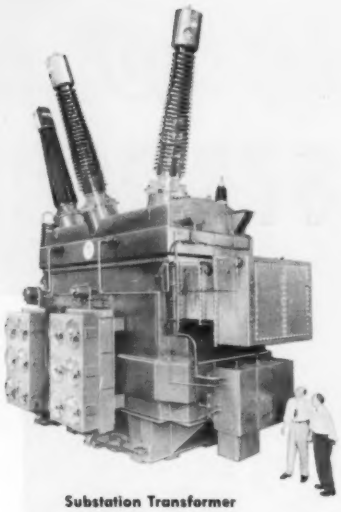
Core form or Shell form

Pennsylvania builds both types of transformers for Generating Station and Substation Service

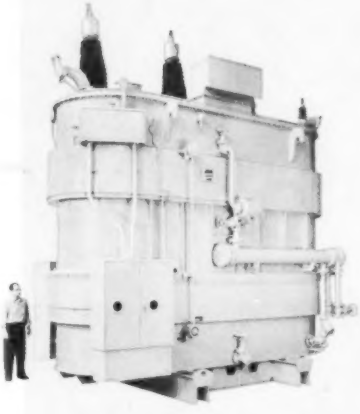
With wide experience in both shell form and core form design, Pennsylvania Transformer engineers are able to provide the transformer that is best suited to every application. Full consideration is given to size and weight, ease of installation, impedance, resistance to short circuit stresses, insulation strength, method of cooling, and other characteristics which result in definite advantages in a given kva and voltage for one design or the other.

Core form or shell form? Why not let the answer for your next transformer be based on Pennsylvania's proved principles of power transformer design?

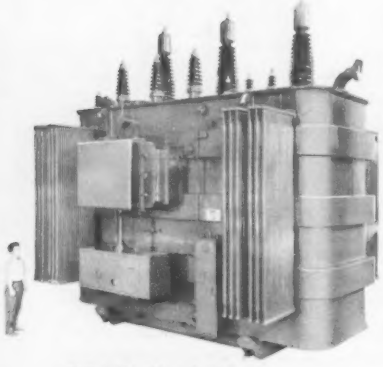
PENNSYLVANIA TRANSFORMER COMPANY
A McGraw Electric Company Division
CANONSBURG, PA. Greater Pittsburgh District



Substation Transformer
100,000 Kva, 3 Phase,
With load tap changing equipment
High Voltage: 330,000 Grd Y volts with ±10% regulation in 32 steps of ⅝%
Low Voltage: 14,400Δ volts

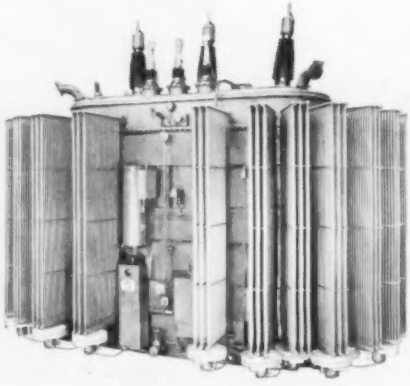


Generating Station Transformer
48,000 Kva, 3 Phase
High Voltage: 115,000 Grd Y volts
Low Voltage: 13,200Δ volts



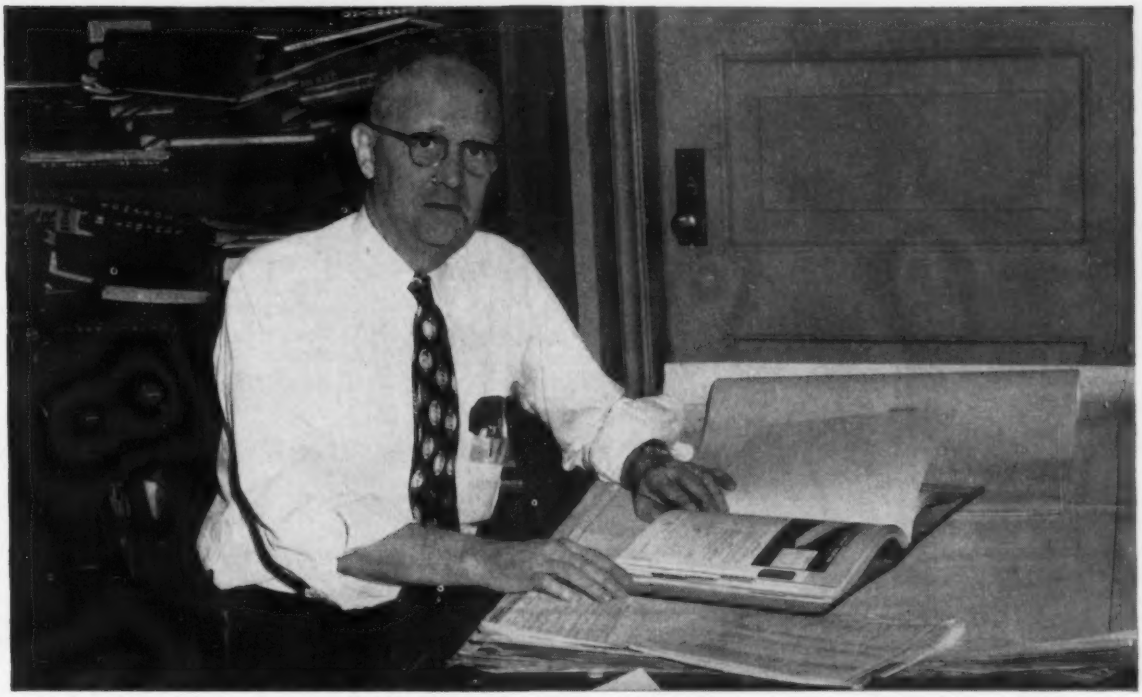
Substation Transformer
15,000 Kva, 3 Phase, with load tap changing equipment
High Voltage: 154,000Y volts
Low Voltage: 69,000 Grd Y volts with ±10% regulation in 32 steps of ⅝%
Tertiary Voltage: 12,470Δ volts

Substation Transformer
30,000 Kva, 3 Phase, with load tap changing equipment
High Voltage: 66,000Y volts, with plus and minus 5% regulation in 32 steps of ⅝%
Low Voltage: 33,000Y volts
Tertiary Voltage: 13,800Δ volts



Generating Station Transformer
56,000/70,000 Kva, 3 Phase
High Voltage: 132,000Y volts
Low Voltage: 15,000Δ volts

Lighting by DAY-BRITE Lighting Fixtures makes the big difference . . .



Mr. Wm. E. Ketler, Vice President, Blumenthal-Kahn Electric Company, Baltimore, Md.

"No wasted time with Day-Brite fixtures"

"There are a lot of things we like about Day-Brite fixtures. Just to mention one:

"Day-Brite fixtures come to us complete and ready to install. Everything's furnished—we don't waste valuable time looking around for missing parts or doing any recutting or rethreading.

"That lets us finish the job quickly and move on to the next. It all adds up to happy customers and a clean profit on the job."

Mr. Ketler knows what he's talking about, just like hundreds and hundreds of other contractors all over the country.

Certified Lighting for a Better America

61180

"DECIDEDLY BETTER" DAY-BRITE Lighting Fixtures

Day-Brite Lighting, Inc.
5412 Bulwer Avenue
St. Louis 7, Missouri

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

***ONLY* ON THE GENERAL ELECTRIC *I*-55 METER:**

$4.77 CAN BE

Tests, service prove General Electric I-55 meters can save you money

GREATER SUSTAINED ACCURACY

New test data on meter performance, compiled in G-E research laboratories, prove that General Electric's revolutionary "floating disc" meter provides high sustained accuracy which saves you money.

During accelerated life tests, identical loads were applied to the G-E I-55 meter and to meters with conventional bearing systems. The results are startling.

Here's the proof. Assume an average

GREATLY REDUCED TILT ERROR LOSSES

Any meter operating at even a slight tilt will give inaccurate readings that often result in loss of revenue. General Electric lab tests prove that I-55 meters with magnetic suspension "floating discs" are least affected by tilt—while the accuracy of meters with conventional ball bearing systems varies considerably with different angles of tilt.

Here's the proof. A conventional meter at one degree forward tilt, operating at a continuous average of 240 volts, 1.5 amperes, would lose .01728 kwhrs

NO PERIODIC BEARING REPLACEMENT

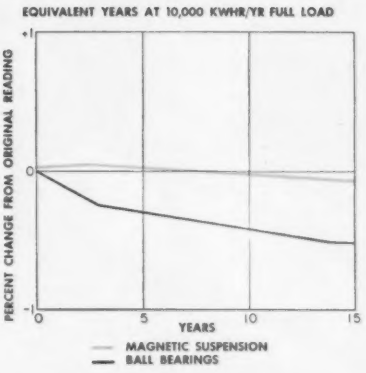
For complete details on how I-55 meters can save you money, call your nearby G-E Apparatus Sales Office. For information on the complete line of General Electric watthour meters, write Section 621-10, General Electric Co., Schenectady 5, N. Y.

TOTAL FIFTEEN-YEAR

GENERAL ELECTRIC

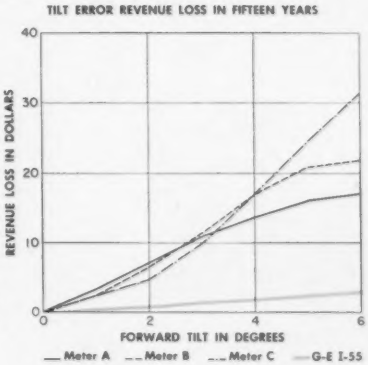
SAVED IN JUST 15 YEARS

kwhr usage per consumer (based on *Electrical World* forecasts) per year for fifteen years and the per cent loss on registration per year—the total loss in kwhrs would be 266.8 for a conventional meter. At two cents per kwhr, this means a gross loss of $5.34. By considering the "present worth" factor at 6 per cent interest for each year, the net loss on a conventional meter would be $3.14. The I-55 eliminates this loss and saves you the money.



$3.14

registration over the I-55 in 24 hours. In 15 years, the kwhr loss would be an amazing 94.40 kwhrs. Taking a reasonable figure of two cents per kwhr, the gross loss would be $1.89. By considering the "present worth" factor at 6 per cent interest for each of the fifteen years, the conservative saving realized by using a General Electric I-55 meter would be $1.29. And a glance at the chart on the right reveals much higher savings at tilt errors of 2 degrees to 6 degrees.



1.29

The trouble and expense of periodic bearing replacement is eliminated when you use General Electric I-55 meters with the "floating disc."

General Electric accelerated life tests prove that ball bearings in ordinary meters must be inspected and in many cases replaced after a comparatively short period of time. The G-E I-55 meter with magnetic suspension—and no bearings—showed no measurable wear even after the equivalent of more than 300 years of normal operation.

Bearing replacement is costly. Here's a typical example. Assuming replacement occurs after fifteen years' service, and taking into account an estimated average replacement cost and the "present worth" factor at 6 per cent interest, a conservative cost for bearing replacement on each conventional meter would be 34 cents. With no bearings to replace on the I-55 you save 34 cents on every meter.

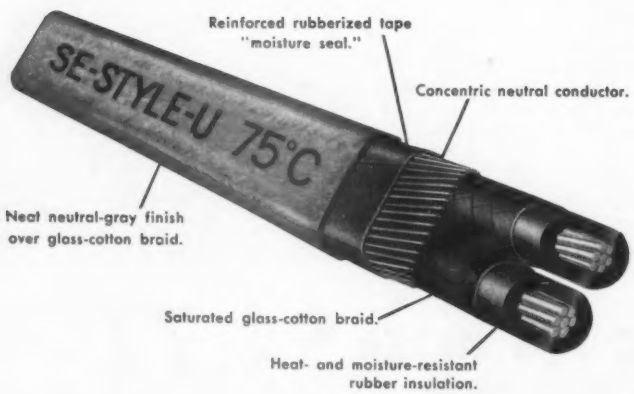
.34

AVERAGE SAVING USING I-55 METER $4.77

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Neither heat nor rain will damage this installation of Rome Service Entrance cable. Easy to work, the cable permits neat installations.

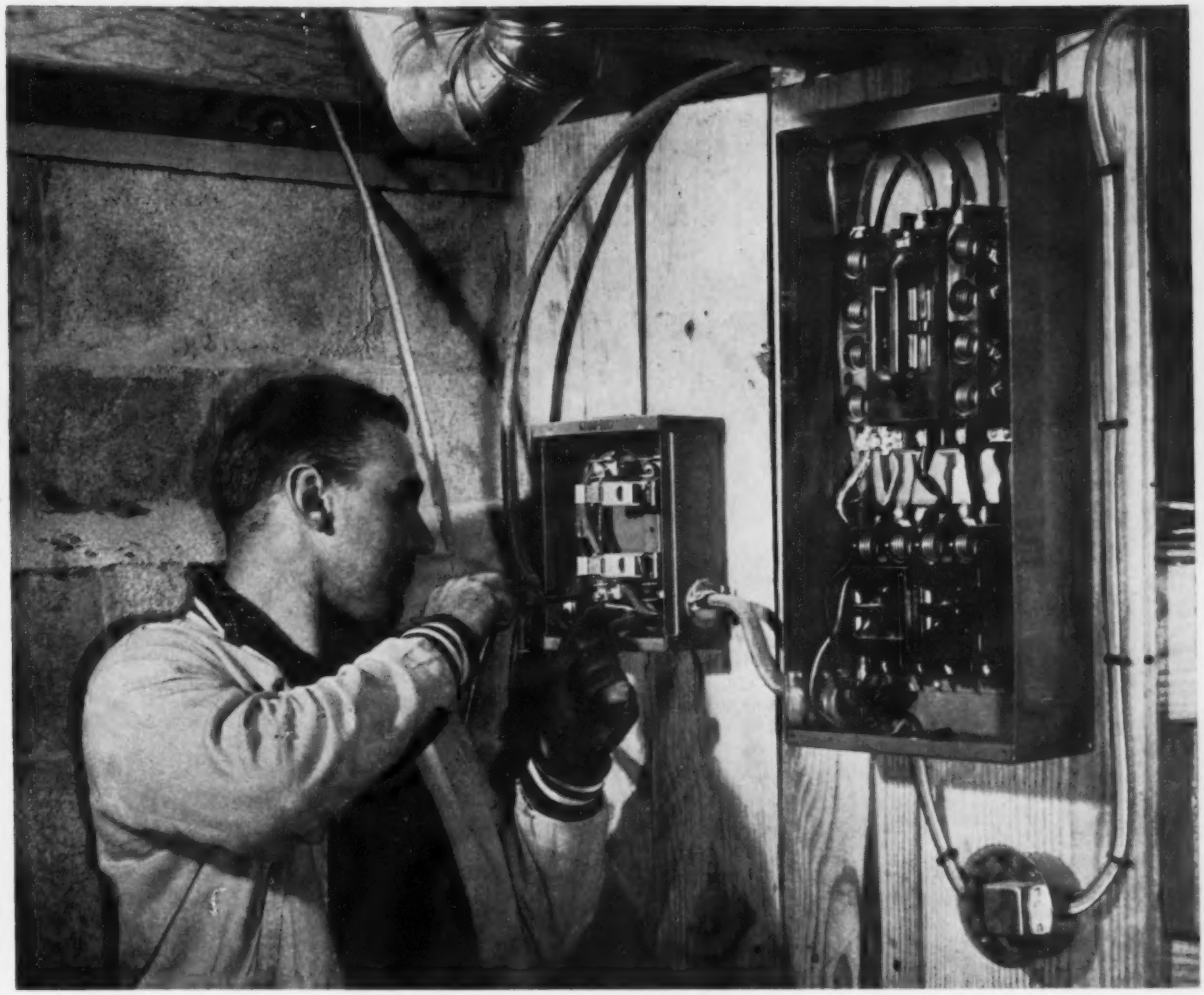
New Rome service entrance cable


Reinforced rubberized tape "moisture seal."
Concentric neutral conductor.
SE-STYLE-U 75°C
Neat neutral-gray finish over glass-cotton braid.
Saturated glass-cotton braid.
Heat- and moisture-resistant rubber insulation.

Rome's new and improved Type SE service entrance cable is the ideal selection for new and re-wired 100 ampere service. It fully meets all the requirements for a service entrance cable that can handle all the electric appliances and air conditioning needs of modern living.

In addition, this versatile cable may enable you to reduce warehouse inventory levels and the amount of cable carried in your service trucks. The same cable can be used:

1. From pole to meter
2. From service drop to meter
3. And from meter to electric range, washing machine, clothes dryer, hot water heater, etc.



Rome Type SE service entrance cable can be used: 1. From pole to meter; 2. From service drop to meter; 3. From meter to electric range, etc.

designed for modern 100 ampere service

Other features of Rome's Type SE cable include:

1. The outer glass-cotton braid is finished to give the cable a neat appearance without sacrificing flame and moisture resistance. This neutral gray finish can be painted, if desired, to match the color of the building on which the cable is installed. It withstands severe storage and service conditions without deteriorating and becoming tacky.
2. The glass-cotton braid on each conductor—one red and one black—is clean, permanent, and provides easy conductor identification. For easy and positive exterior identification, the outside of the cable is surface printed "SE-Style U 75°C."
3. Underwriters' approved for 75°C. operation in *either dry or wet* locations. A reinforced rubberized tape under the weather-resistant outer braid puts the assembled conductors in a "dry location." In addition, the moisture seal provides added protection against cutting by clamps and other fittings, increasing service life.
4. In three conductor construction for 100 ampere service, Underwriters' approval makes possible the use of size 3 AWG copper conductors, or two conductors of size 3 AWG with a neutral conductor of size 5 AWG.

Specify Rome service entrance cable for your next job. Contact your nearest Rome Cable representative for more information—or write to Department 365-A and ask for Bulletin SE-1. Rome Cable Corporation, Rome, N. Y.

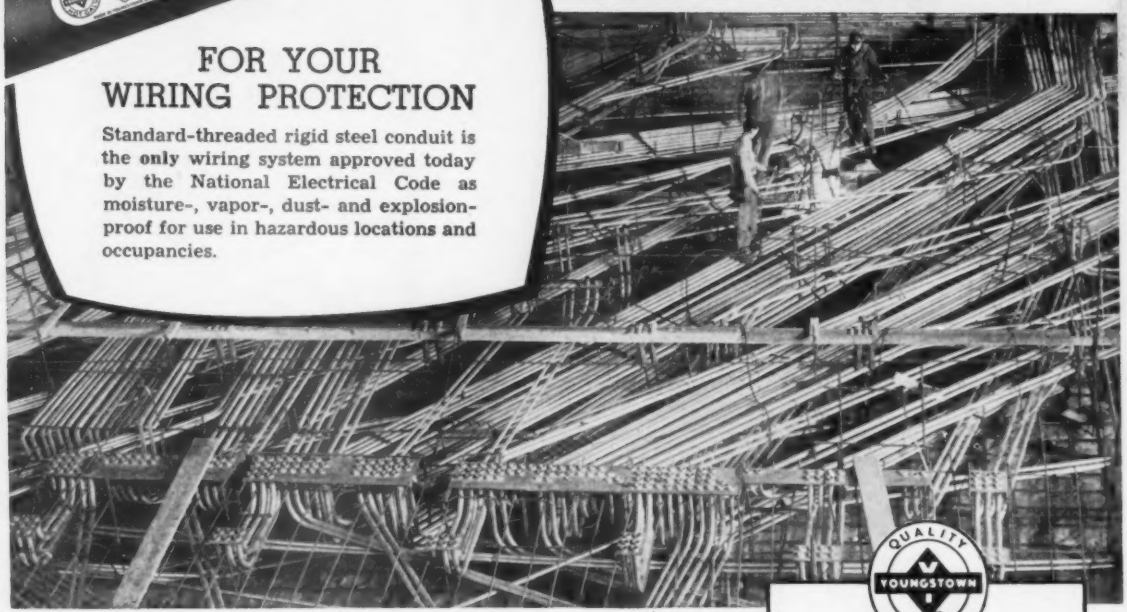
ROME CABLE

CORPORATION

Familiar symbols of safety

FOR YOUR WIRING PROTECTION

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.



Water, moisture, vapor, dust and dirt must be kept out of your wiring systems if they are to be permanently safe. To assure reliable and positive protection, specify Youngstown Buckeye full-weight rigid steel conduit. It's the accepted standard of architects, contractors and owners who have found its higher quality and long service life provide increased profits and trouble-free performance. It's easy to bend—easy to fish wires through. Its excellent corrosion-resistance guarantees permanent installations. Call your electrical distributor today—his stocks are ample and ready for delivery to your job site.

Ask your distributor for Youngstown Buckeye Full Weight Rigid Steel Conduit and Youngstown Electrical Metallic Tubing.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

FEDERAL PACIFIC gives you...

self-protecting* oil circuit breaker operating mechanism

ALWAYS 100% TRIP FREE

under all conditions

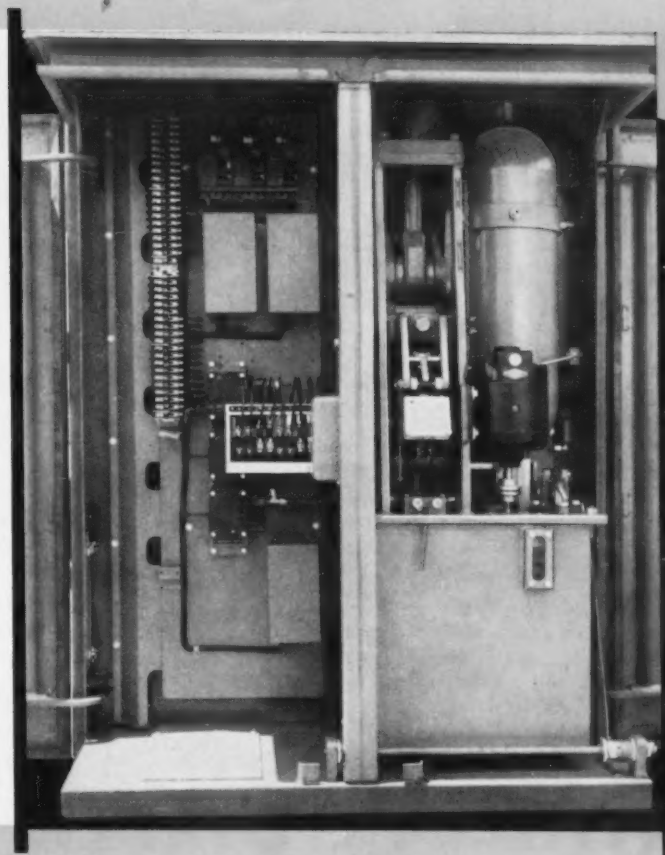
*automatic supervision

Automatic supervision of the hydraulic system protects the breaker against mis-operation.

highest safety factor

The smoothness of operation is such that the breaker may be operated indefinitely without oil in the tanks... thus demonstrating the highest mechanical safety factor.

For details of the Type OA Operating Mechanism write for Catalog No. 4-587: Pacific Electric Switchgear Division, 5815 Third Street, San Francisco, California.



Finest Products Engineered

FEDERAL PACIFIC ELECTRIC
COMPANY
50 Paris Street, Newark 1, N. J.

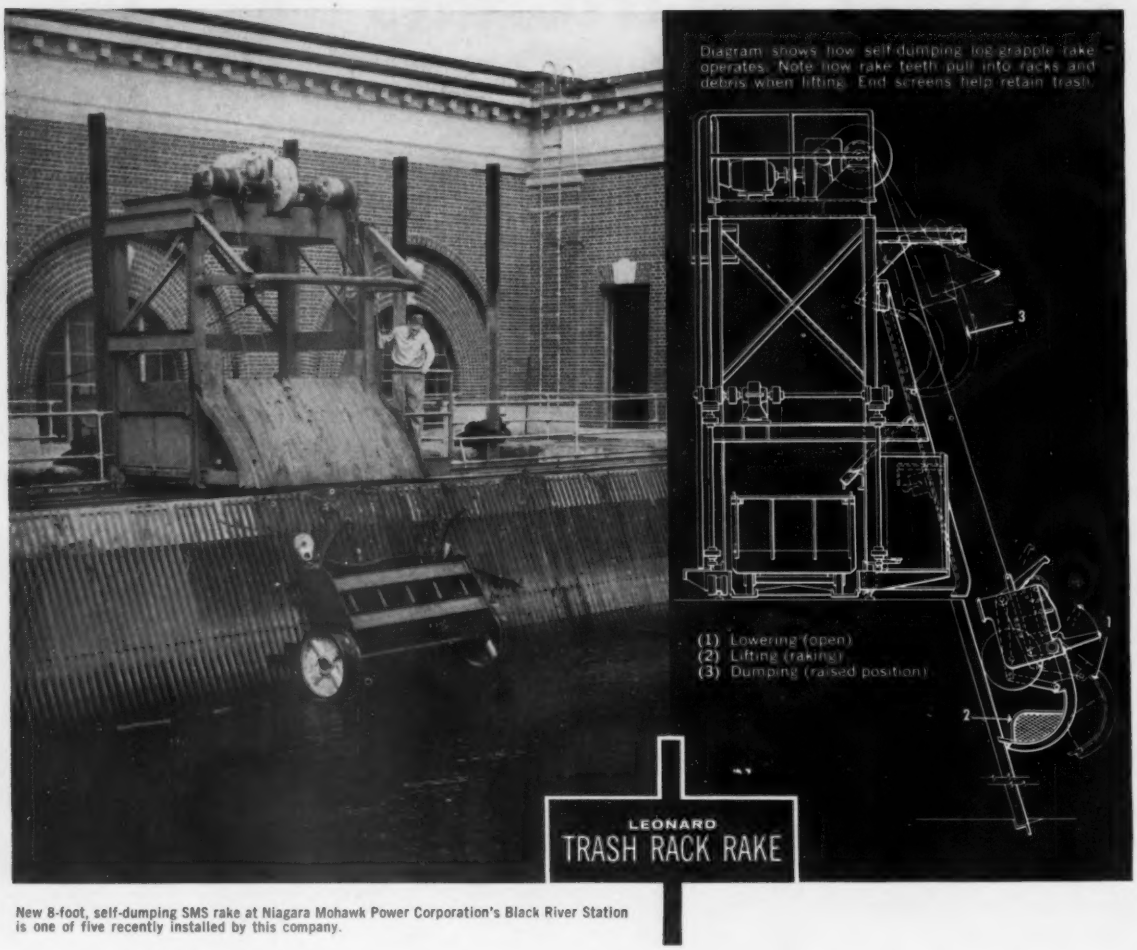


Diagram shows how self-dumping log grapple rake operates. Note how rake teeth pull into racks and debris when lifting. End screens help retain trash.
(1) Lowering (open)
(2) Lifting (raking)
(3) Dumping (raised position)
1
2
3
LEONARD
TRASH RACK RAKE

New 8-foot, self-dumping SMS rake at Niagara Mohawk Power Corporation's Black River Station is one of five recently installed by this company.

Two New Self-Dumping SMS Trash Rake Designs CUT CLEANING TIME AND LABOR

Now SMS offers you two improved Leonard trash rack rakes, both regular and log-grapple types. These self-dumping rake designs make operation easier and quicker, permit you to clean a greater area faster. Both new rake types are now available as additions to the SMS line of standard rake designs.

SMS Leonard rakes operate directly on trash rack bars . . . ride down over stubborn obstructions and work them loose. Such freedom of movement assures fast, easy cleaning. Initial costs are low because the width of SMS rakes can be kept to the minimum required for handling for trash and the expense of guides attached to racks, or embedded in piers is eliminated. These rakes are of simple and rugged construction, designed for outdoor service and require minimum maintenance.

To get full information on Leonard trash rakes, or on other SMS accessories and hydraulic turbines, write to S. Morgan Smith Co., York, Penna. For Leonard rakes, request Bulletin 158.

SMS

S. MORGAN SMITH

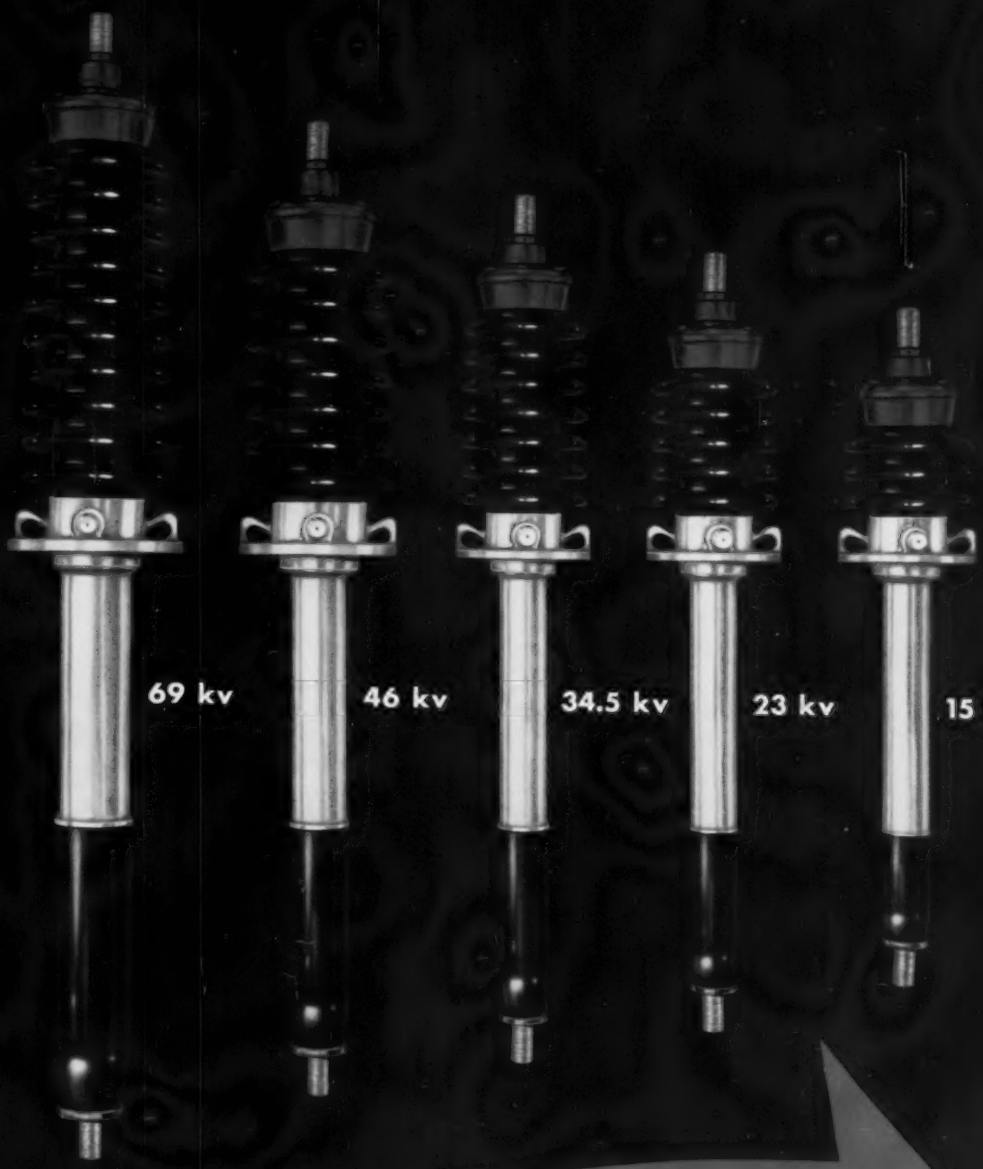
AFFILIATE: S. MORGAN SMITH, CANADA, LIMITED, TORONTO

HYDRAULIC TURBINES · PUMPS · GATES & HOISTS · TRASH RAKES · LIQUID HEATERS

HYDRODYNAMICS

ROTOVALVES · BALL VALVES · BUTTERFLY VALVES · FREE DISCHARGE VALVES · CONTROLLABLE-PITCH SHIP PROPELLERS

Licensees: The Harland Engineering Company, Ltd., Alloa, Scotland • Tokyo Shibaura Electric Co., Ltd., Japan

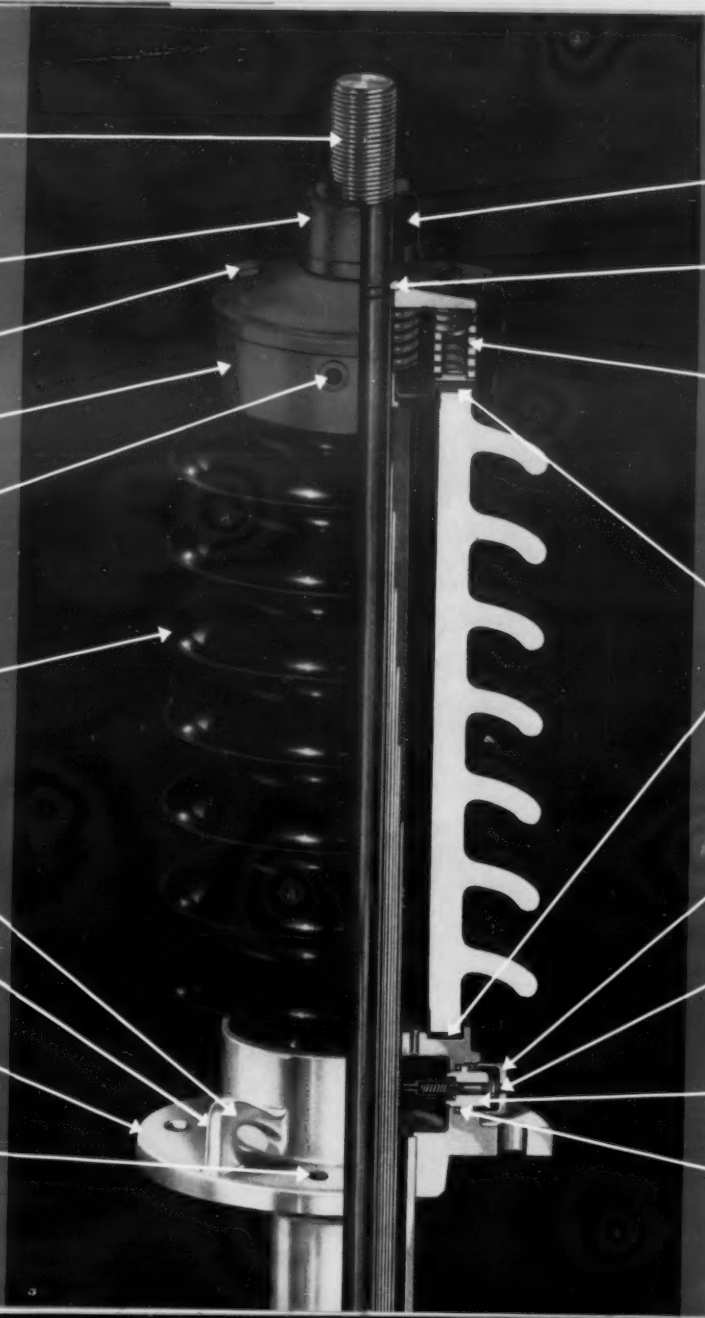


Announcing...

Lapp POC* BUSHINGS

ASA STANDARD

***THE PAPER-OIL CONDENSER TYPE BUSHING THAT BRINGS THE OPERATING SECURITY OF TOTALLY-ENCLOSED MOISTURE-PROOF DESIGN FOR RATINGS 15 kv TO 69 kv**

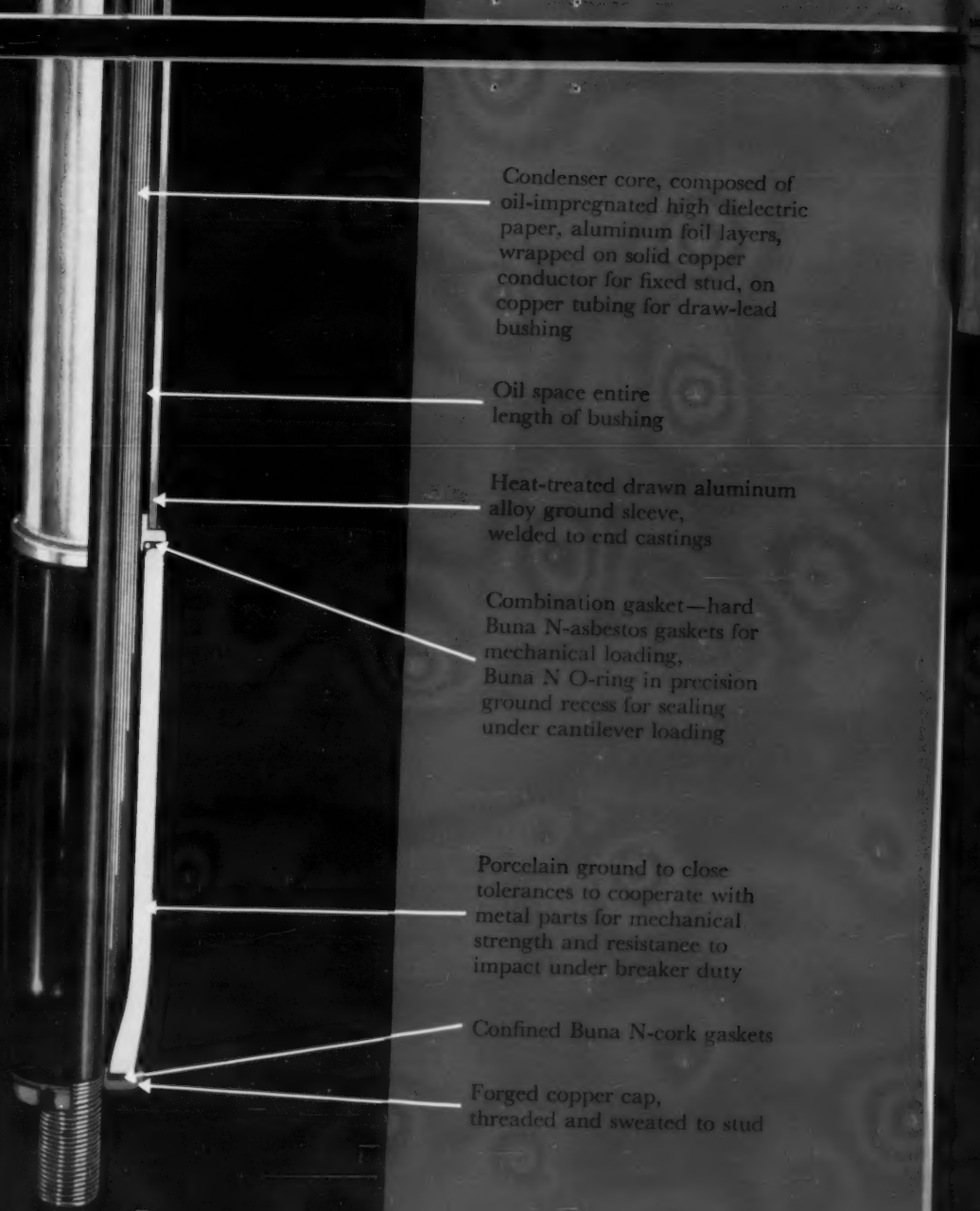

Copper stud or draw-lead terminal, silver plated contact surfaces
Copper cover to protect bellows, painted red
Filler plugs, O-ring sealed
Drawn copper oil reservoir, painted red
Tapped hole for arcing horn
Lapp Fog Type corrugations, for most effective leakage distance, Vacuum Process chocolate brown glazed porcelain, with ground gasket surfaces
Two lifting eyes 180° apart
Aluminum nameplate attached with stainless steel screws
Heat-treated cast aluminum alloy flange
Threaded jacking screw holes, one in alignment for lower arcing horn
Solder-sealed phosphor bronze bellows unit to insure sealing with conductor movement
Stainless steel split locking ring
Multiple coil springs compressed to provide controlled permanent gasket loading
Confined Buna N-cork gaskets
Aluminum grounding cap
Power factor (grounding) tap, connected to copper band on outer foil layer of condenser core
Vacuum process glazed porcelain bushing, ground gasket surfaces
Buna N O-rings

Lapp

POC* BUSHING

*PAPER-OIL CONDENSER TYPE
WITH TOTALLY ENCLOSED CORE

ASA STANDARD



Condenser core, composed of oil-impregnated high dielectric paper, aluminum foil layers, wrapped on solid copper conductor for fixed stud, on copper tubing for draw-lead bushing

Oil space entire length of bushing

Heat-treated drawn aluminum alloy ground sleeve, welded to end castings

Combination gasket—hard Buna N-asbestos gaskets for mechanical loading, Buna N O-ring in precision ground recess for sealing under cantilever loading

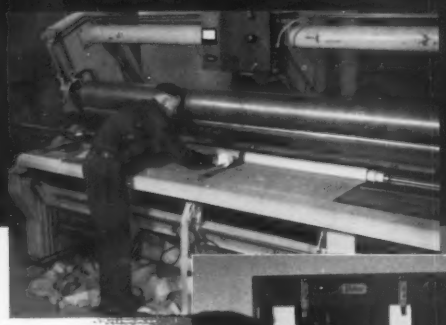
Porcelain ground to close tolerances to cooperate with metal parts for mechanical strength and resistanee to impact under breaker duty

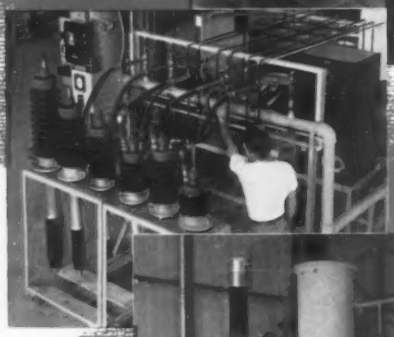
Confined Buna N-cork gaskets

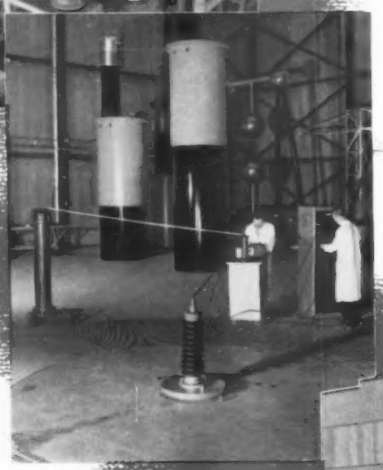
Forged copper cap, threaded and sweated to stud

Lapp POC BUSHINGS

provide the operating security of totally-enclosed moisture-proof design for ratings 15 kv to 69 kv







Paper-oil is the insulation used for bushings, cables and potheads of the highest voltages and where the maximum in reliability and trouble-free performance is essential. To provide the same order of operating security to equipment used at 15 kv to 69 kv, Lapp has adopted this design of construction for its new series of POC Bushings (ASA-NEMA standard).

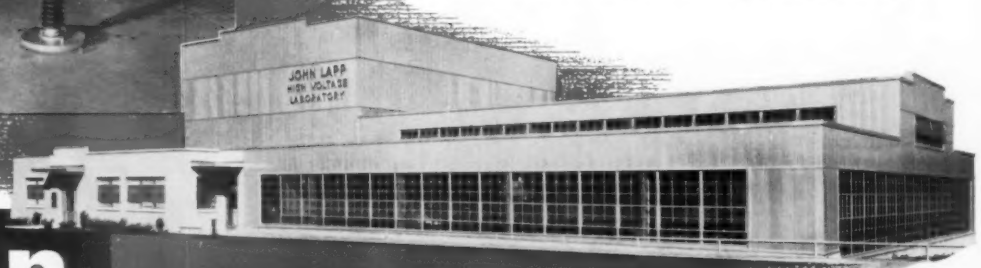
CONDENSER-TYPE CORE, SURROUNDED BY OIL—The core is a condenser . . . multiple concentric layers of aluminum foil and kraft paper . . . which distributes voltage stress evenly throughout the insulation, to provide maximum insulation in smallest diameter. Impregnated with oil, the core is also entirely surrounded by oil, contained in a full-length porcelain-metal housing.

SPRING-LOADED COMPRESSION SEALING—Porcelain housings are Lapp Vacuum-process electrical porcelain. This inorganic material is non-tracking, will not deteriorate under leakage current. Leak-proof, moisture-proof sealing is accomplished by end-to-end spring-loading of compression gaskets.

COMPLETE RANGE OF RATINGS AND SIZES—In five voltage ratings, 15 kv through 69 kv, Lapp POC Bushings are rated at 1200 amps (with solid copper through-stud) and 400 amps (with draw-lead conductor). Six shank lengths in each voltage class provide for practically all new equipment and replacement needs.

At all rated voltages, Lapp POC Bushings are radio- and television-interference-free. They have a significantly low power factor, essentially unchanging under temperature or voltage variation.

The new Lapp bushing building. High-voltage Laboratory (at left) contains equipment for 60-cycle testing to 1,050,000 volts, impulse testing to 2,250,000 volts, high-current testing to 10,000 amps. The section of the building at the right is devoted to core-winding, processing and assembly of oil-filled bushings.



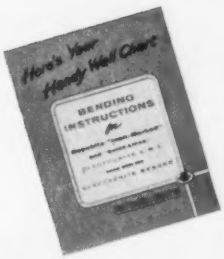
Lapp

WRITE for Bulletin 508 . . . complete description, specifications and characteristics of Lapp POC Bushings.
Lapp Insulator Co., Inc., LeRoy, N. Y.

YOU'LL STAY 'WAY AHEAD OF THE CONCRETE BOYS...when you're installing

SMOOTH BENDING AND EASY MEASURING are two reasons Republic ELECTRUNITE E.M.T. is so popular. The Guide Line, when properly used, eliminates costly "wows". Bends can be pre-planned, made accurately right on the job. Simply align the Guide Line with correct calibrations on the Republic Bender and you can't miss. "Inch-Marks" help you avoid clumsy problem of a flat rule on a round tube. Each inch and foot of tubing is clearly marked to permit easy measurement of exact length. On all popular sizes.

REPUBLIC "Inch-Marked" E.M.T.



IT'S "INCH-MARKED" for easy measuring.

IT'S "GUIDE-LINED" for accurate bending.

You don't have to worry about a pocket full of wet concrete when you work with Republic ELECTRUNITE® E.M.T. It goes in so smoothly you can't help staying ahead of schedule.

The reason: Republic E.M.T.'s *exclusive* features that simplify the job from planning to wire pulling.

Measuring distance is easier because the entire length of tubing is marked in inches and feet. Bends are easier to make accurately—and without costly "wows"—due to the handy, longitudinal Guide Line. Wire pulling is almost effortless because of the knurled "ball-bearing" inside surface of the tubing —another Republic exclusive.

Republic ELECTRUNITE E.M.T. makes it easier to meet schedules for any type of construction. For concrete-slab construction it's 100% approved by the National Electrical Code.

Keep the concrete boys off your back, and at the same time reduce costs by installing Republic E.M.T. Just ask your electrical distributor for the E.M.T. that's "Inch-Marked"® and "Guide-Lined." Check box in coupon to get free wall chart (left) that includes tips on using the Republic Calibrated Bender.

REPUBLIC STEEL

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
Steel and Tubes Division
Dept. C-1909A
216 East 131st Street • Cleveland 8, Ohio

Please send me more information on:
☐ ELECTRUNITE "Inch-Marked" E.M.T.
☐ Bending Instructions (Handy Wall Chart)

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

for time-saving, money-saving ONE-STOP SHOPPING...

GO GLOBE

GLOBE HAS EVERYTHING!

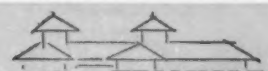
The Globe line is a *complete* line — for every decor, every room, every need — indoors or outdoors! The Globe line is a *big* line — all-inclusive in its styling, its materials, its finishes. It has all the answers to the most subtle variations of consumer preference, the most precise decorator requirements of the designer. At Globe, leader in lighting for 34 years, research into lighting trends is a continuous process. Globe watches, anticipates, *sets* trends in lighting fashion. Our production facilities are unsurpassed, our quality the standard of comparison! You can fill all your needs at Globe — the one-stop shopping center of the industry!

FOR A BRIGHTER PROFIT PICTURE, SWITCH TO

GLOBE

Visit our brand new Showroom, at the same address
16 East 40th Street, just off Fifth Avenue in New York City.
Write today for your copy of the new 44-page full color Globe catalog.

GLOBE LIGHTING PRODUCTS, INC.
1710 FLUSHING AVENUE • BROOKLYN, NEW YORK
Our 34th year • *Plants in New York and Los Angeles*



Another **TRIANGLE** *multiple product Job*

PALM BEACH

Palm Beach Towers. Florida's Largest Apartment Hotel

...designed for luxurious year-round apartment living:

1,100,000′ of TRIANGLE WIRE and CABLE
169,000′ of TRIANGLE CONDUIT
52,000′ of TRIANGLE COPPER TUBE

Luxury *demands* Quality. That's why Triangle conduit, wire, cable and copper tube were specified for the job.

Triangle is famous for the finest quality building products that research and modern equipment can produce.

Triangle products are nationally distributed—representatives are located in principal cities in the United States. For your next installation, you'll find it pays to call Triangle!

Palm Beach Towers, scheduled for opening December 1, 1956, is completely air conditioned, with restaurants and specialty shops provided to make it one of America's finest resort hotels.

ARCHITECT: John Hans Graham
GENERAL CONTRACTOR: The Taylor Construction Co.
ELECTRICAL CONTRACTOR: Interstate Electrical Co.
PLUMBING CONTRACTOR: Clarence Coston

let's take a quick look at **TRIANGLE**

Up to date research

Ever expanding plants

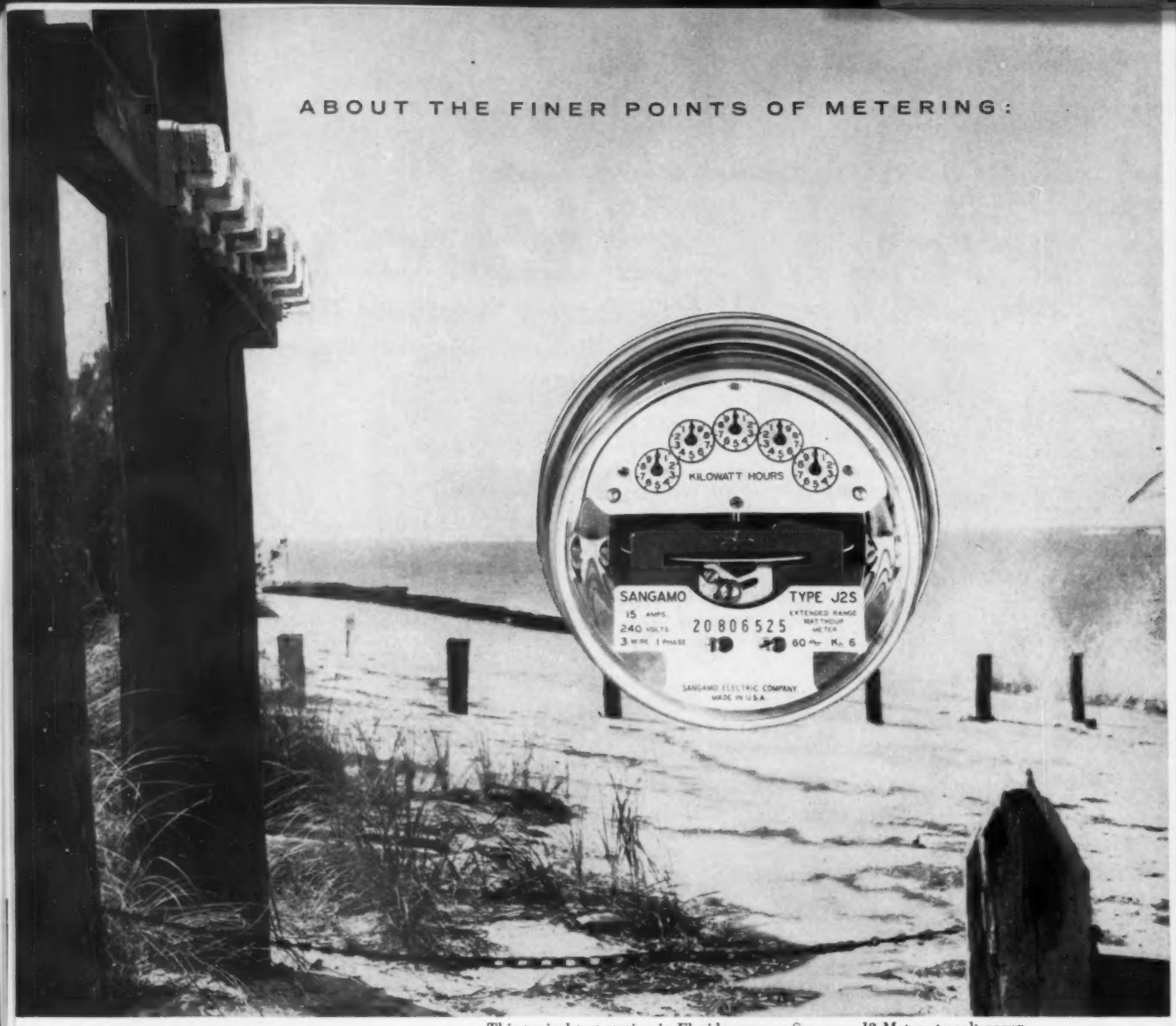
Large stocks in redistribution centers

The Triangle Trademark is your guarantee of quality

It Must Be Right
The Trade Mark of TOP Quality
TRIANGLE

TRIANGLE
Conduit and Cable Co., Inc.
NEW BRUNSWICK, NEW JERSEY

ABOUT THE FINER POINTS OF METERING:



This typical test station in Florida exposes Sangamo J2 Meters to salt vapor atmospheres as part of Sangamo's continuous program of improvement.

Field tests prove corrosive atmospheres can't hurt J2 Meters

Longer meter life—even under the worst possible service conditions—is the subject of constant study and research at Sangamo.

The findings of continuous field tests since 1952 at salt atmosphere test stations on the coasts of California—Texas—Florida . . . corrosive industrial atmosphere stations in chemical industry areas, are the basis of the corrosion-resistant design of the J2.

All external and internal meter parts are given complete protection against all conditions of outdoor exposure. The use of rust inhibitors, oxide films, inorganic seals and special plating on all metal parts and the inert organic Selkyd meter base assure many years of maintenance-free service under the toughest conditions.

And remember, the J2 Meter is the *slow speed* meter—only 10 revolutions per minute at full nameplate rating—another reason why the J2 is your best investment in a watthour meter.

Live Better Electrically

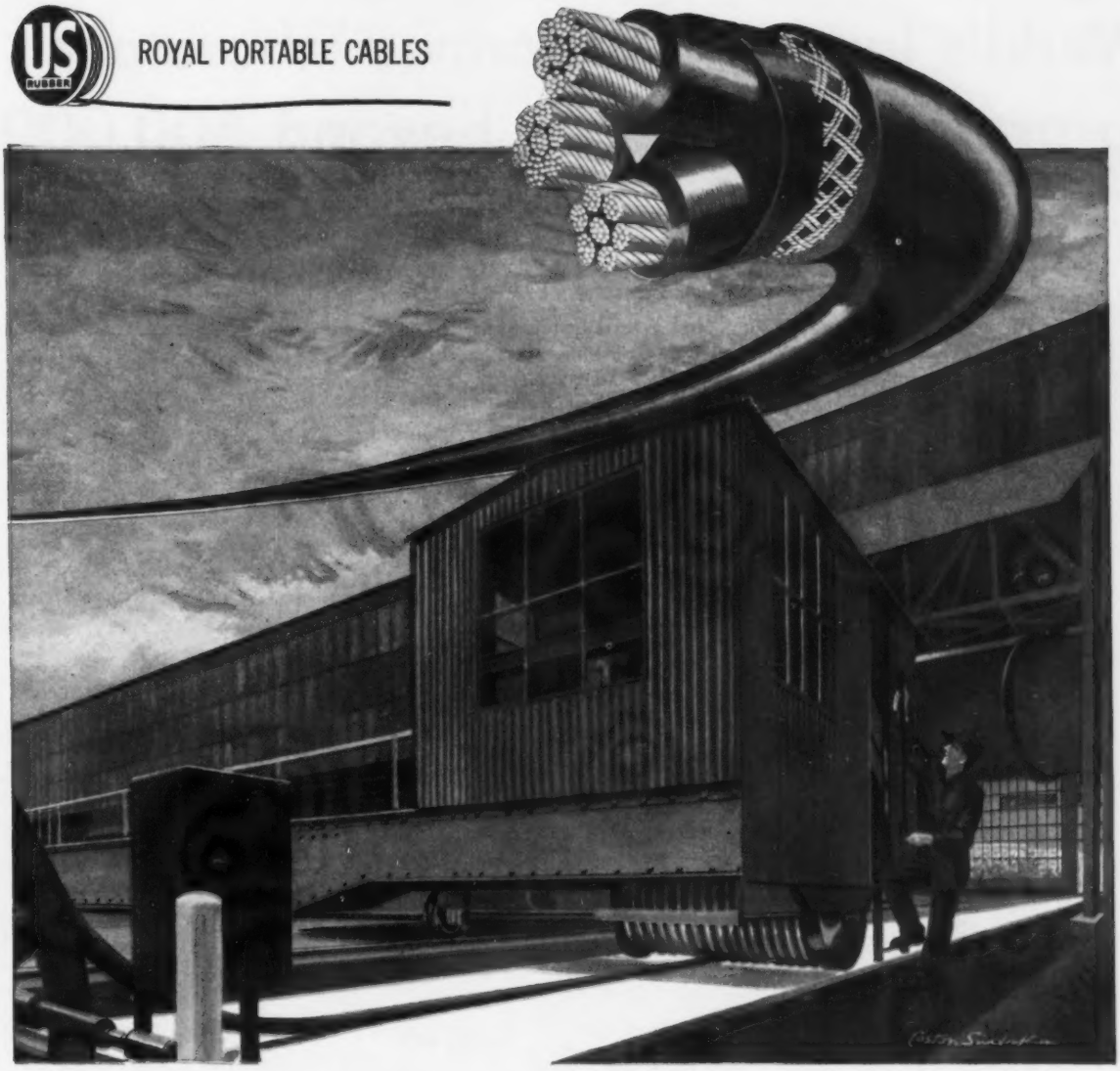
SANGAMO

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

JM56-7

US RUBBER ROYAL PORTABLE CABLES



Still in Service after 29 years, 24 hours a day

and without a single splice, patch or power failure!

This amazing record was made by a 175-foot length of U. S. Royal portable cable installed in 1927 as a source of power for a traveling agitator in a cement plant*. This three-conductor cable has been fully exposed to weather for the entire 29 years. The agitator moves back and forth the length of the slurry basin, and the cable is simultaneously taken up and paid out by a revolving drum.

To "U. S." engineers, performances such as this are not too unusual. They stem, right at the start, from the determination of "U. S." technicians to produce only a *quality* product. This is possible because "U. S." is the only wire manufacturer to grow its own natural rubber, make its own synthetic rubber and its own plastics, assuring complete quality control with the help of unmatched research and manufacturing facilities.

Call on the "U. S." wire and cable specialist to solve any wiring problem. Write United States Rubber Company, Rockefeller Center, New York 20, N. Y.

*Penn-Dixie Cement Corp., Tenn.

Watch NCAA football, Saturday afternoons, NBC-TV

US RUBBER Electrical Wire & Cable Department

United States Rubber

NEWEST WESTINGHOUSE TEST CENTER . . .

World's largest transformer laboratory to prove performance beyond 500,000

Here's a Westinghouse investment that is now adding value to every dollar you put into Westinghouse power transformers. In one vast new facility is a combined commercial and experimental testing laboratory at the Transformer Division, Sharon, Pa.

From this ultramodern laboratory, used primarily for research and development, will come transformers of the future. The new anechoic vault, for example, will make complete sound measurements to and beyond 500,000-kva ratings; find ways to throttle structural resonance; ferret out strengths and weaknesses of new core materials and processes; speed inquiry into new methods of reducing vibration and sound.

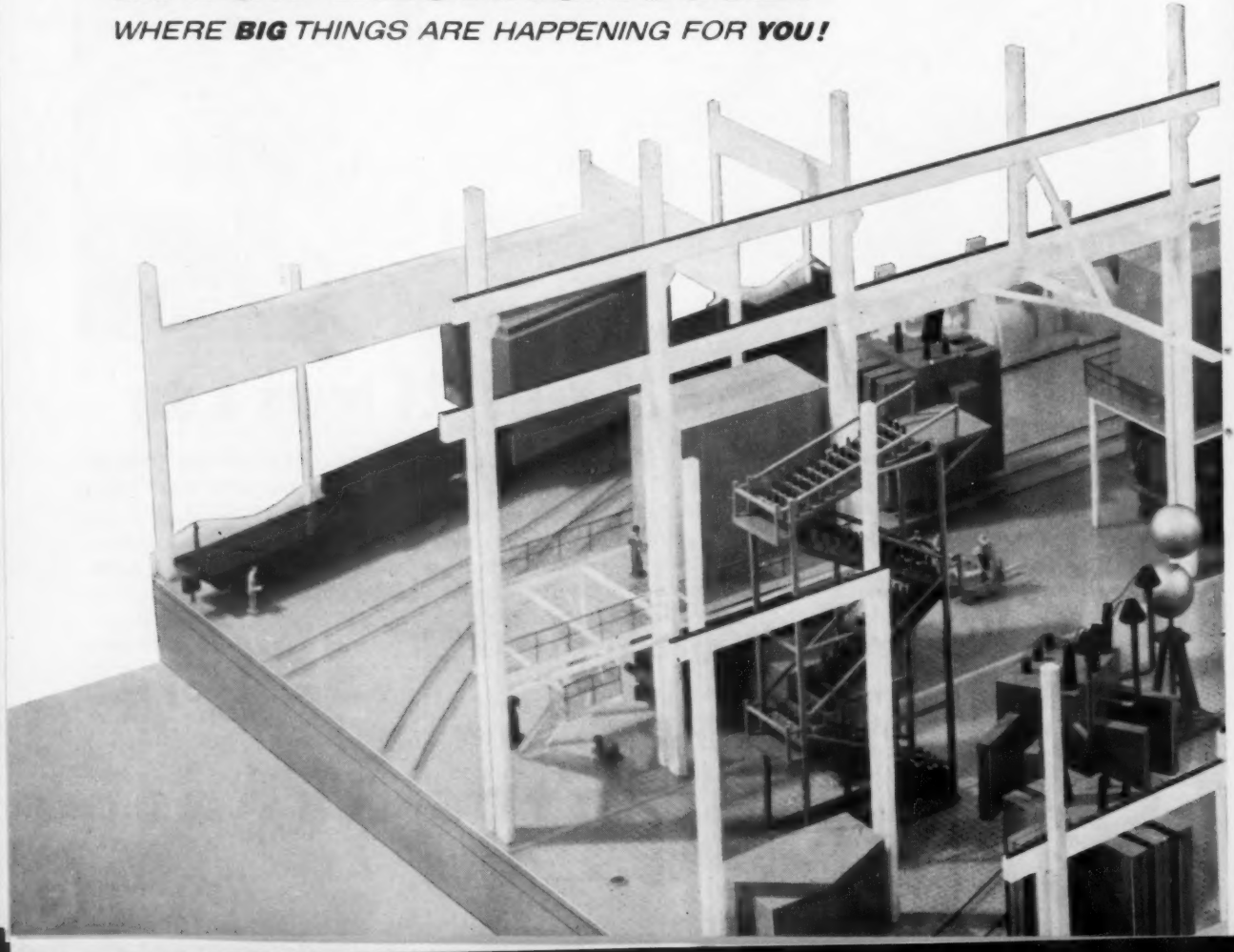
In the high-voltage laboratory, new insulation systems are being developed. Here, models — and full-scale transformers — are tested to destruction. This laboratory is equipped, in fact, to evaluate total electrical performance of the largest commercial units predicted for a decade ahead.

Here today is equipment that immeasurably strengthens the promise of performance in things to come — from Westinghouse.

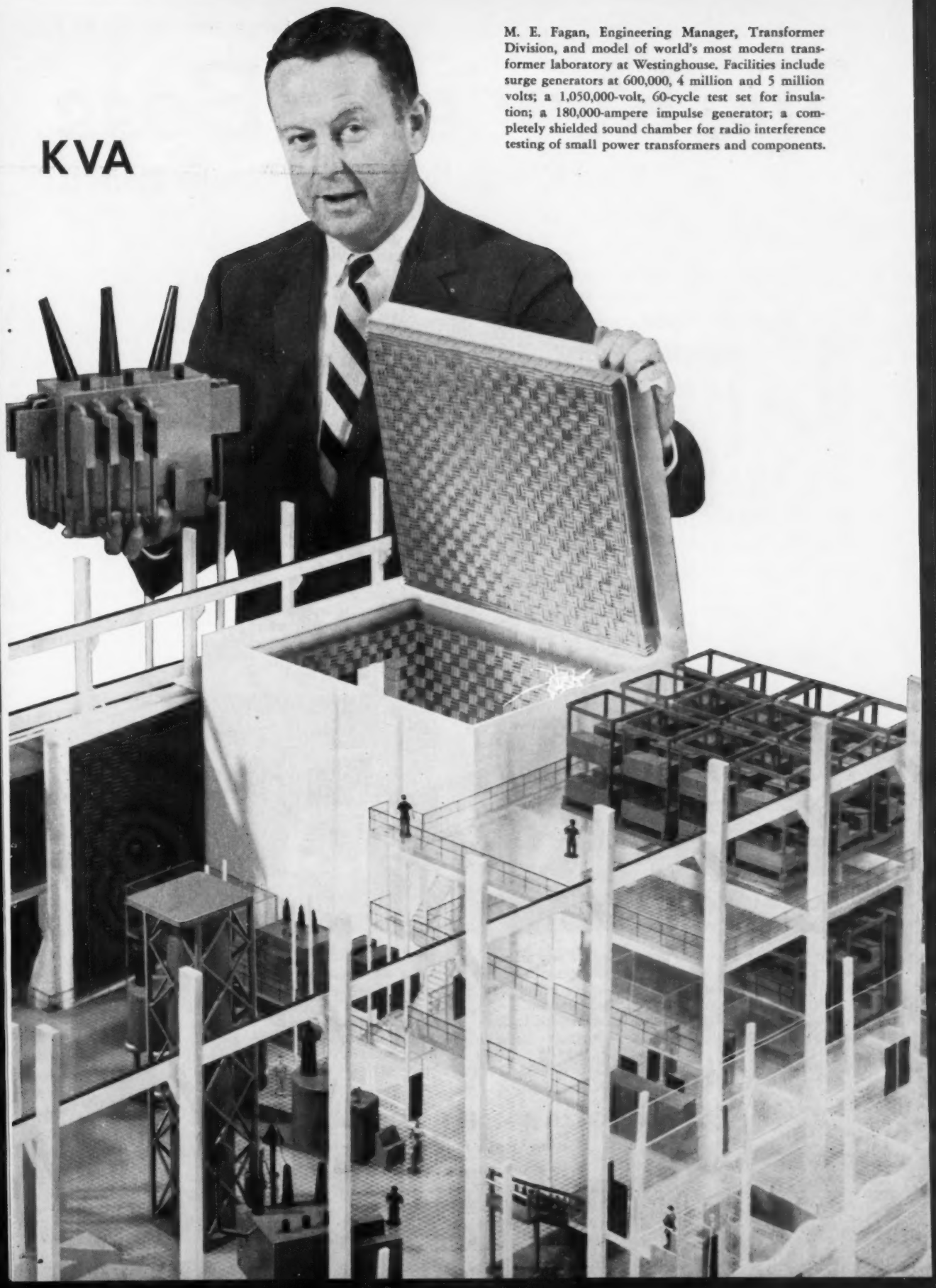
J-70783

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU**!*



KVA

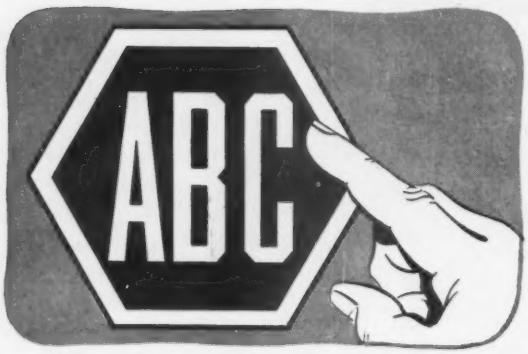


M. E. Fagan, Engineering Manager, Transformer Division, and model of world's most modern transformer laboratory at Westinghouse. Facilities include surge generators at 600,000, 4 million and 5 million volts; a 1,050,000-volt, 60-cycle test set for insulation; a 180,000-ampere impulse generator; a completely shielded sound chamber for radio interference testing of small power transformers and components.

The Reader Is Boss

or...How ABC Helps You Run The Magazine Business

Readers who pay for magazines are always ripe for new ideas, new information, new trends and new technological developments. By giving or withholding their subscription money, reader-customers vote for or against editors and publishers. Counting these "votes" is the important job of the *Audit Bureau of Circulations* – the watchdog of the publishing industry.



YOU CAN TELL which magazines have fully-audited paid circulation when you see the ABC symbol on their cover or contents page. This is the symbol that stands for the Audit Bureau of Circulations, a cooperative organization that sets standards of good business conduct for its publisher members.

ACCURATE FIGURES – ABOUT YOU are the heart of ABC's job. ABC does a candid, unbiased, certified audit of all subscription figures of member magazines – and of the subscribers' jobs, functions, and locations. These audits help editors to tailor the contents of their magazine to your specific job interests.

YOU'RE THE BOSS when you pay money for any magazine. Your vote of confidence and your renewals of subscriptions are dominant in the thinking of editors and publishers. Advertisers are vitally interested, too, and their support helps earn the dollars needed to do a stronger, more useful editorial job for you.

YOU, THE SUBSCRIBER, WIN when you buy ABC magazines, for this mark is your assurance that you are getting a publication tailored to your needs. McGraw-Hill has been a charter member of ABC and has supported its aims continuously for over 40 years. And ABC, in turn, is responsible in many respects for the high standard of business magazine publishing today.

McGRAW-HILL MAGAZINES

McGRAW-HILL PUBLISHING COMPANY, INC.

330 WEST 42nd STREET, NEW YORK 36, N. Y.

Curtis Color-Magic

GOLDEN ALZAK EDGE-GLO

Something New in Lighting

■ New Curtis Color-Magic Golden Alzak Edge-Glo brings a fresh beauty to traditionally colorless commercial ceilings. New Curtis Golden Alzak uses the same high purity grade aluminum as Curtis Silver Alzak, and has the same hard, transparent aluminum oxide sheath that forms the non-tarnishing, easily maintained finish that is Alzak, plus a life-time of permanent color beauty that never needs refinishing. New Curtis Color-Magic Golden Alzak Edge-Glo is available in 2, 4, and 6 lamp sizes and a variety of bottom closures for complete versatility and the finest in quality lighting, just like the Silver Alzak and white Fluracite enamel finished Edge-Glo. Send coupon for New Curtis Color-Magic Golden Alzak Edge-Glo data.

Curtis Lighting, Inc., 6135 W. 65th Street, Chicago 38, Illinois

Send Curtis Color-Magic Golden Alzak Edge-Glo data to:

Name_____

Affiliation_____

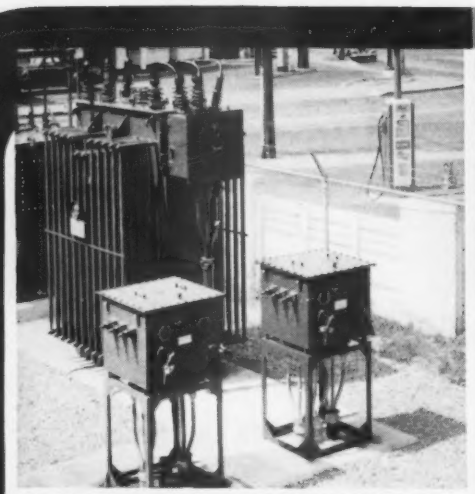
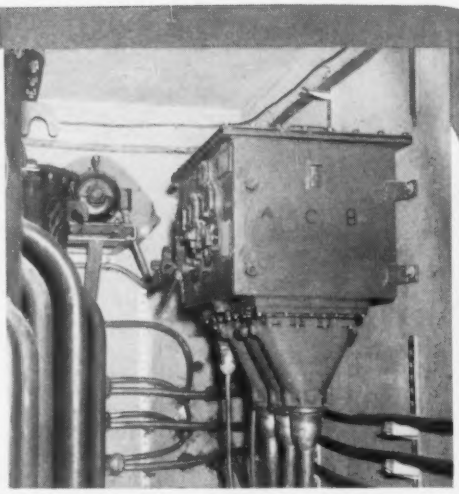
Address_____

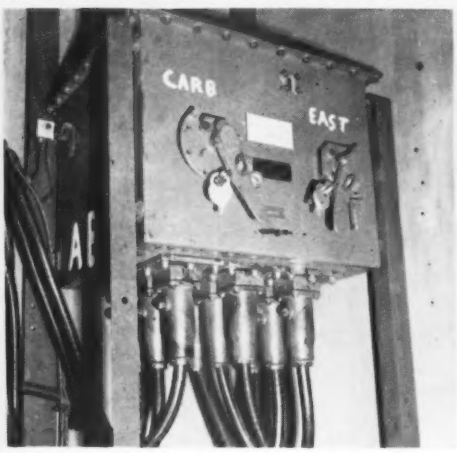
City_____ Zone____ State_____

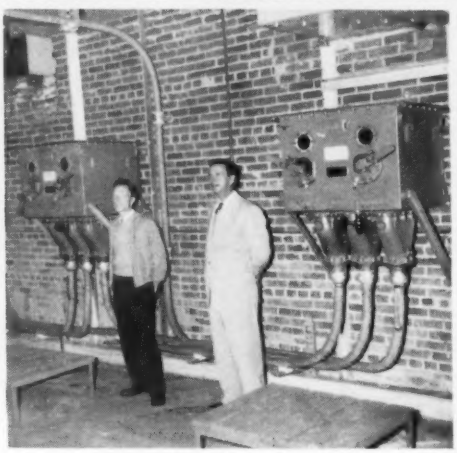
CURTIS

CURTIS LIGHTING, INC., 6135 W. 65TH STREET, CHICAGO 38, ILLINOIS

California, 242 S. Anderson St., Los Angeles 33, California • Canada, 195 Wicksteed Ave., Toronto 17, Canada





LOAD BREAK OIL SWITCHES

make cable systems f-l-e-x-i-b-l-e

G&W TYPE "RA" OIL SWITCHES provide safe, convenient and low cost means for sectionalizing distribution circuits. They have been used since 1928 by many electric utilities. They have a remarkable trouble-free operating record which fully justifies their use as load break disconnects for single and multiple circuits. They are simple in construction, installation and maintenance. They operate properly after long periods of inactivity to provide for isolation of cable sections in case of faults. They permit rapid re-routing of circuits to materially reduce losses incurred through electric service interruptions. They are made in many styles for 2 way to 6 way, cable or overhead connections, 400 ampere, voltages up to 34.5 Kv.

It will pay you to investigate the possibilities of Type "RA" oil switches for your distribution system. Send for Bulletin DB51 and call in our engineer representative.

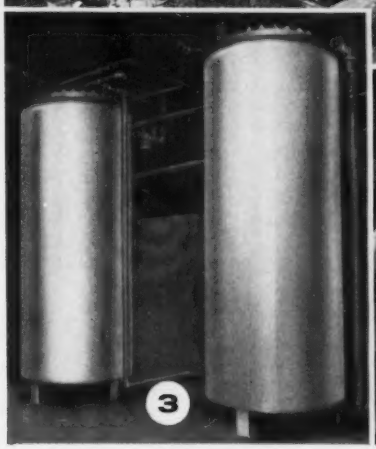
G&W ELECTRIC SPECIALTY CO.
3500 W. 127th Street, Blue Island, Illinois

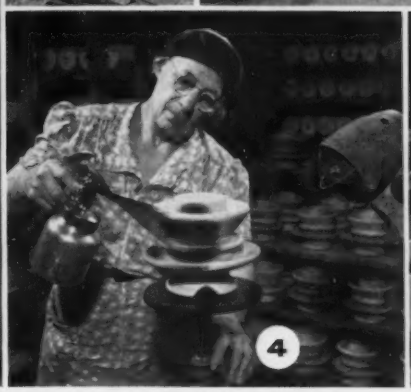
Canadian Mfrs.—Powerlite Devices, Ltd.
Toronto, Montreal and Vancouver

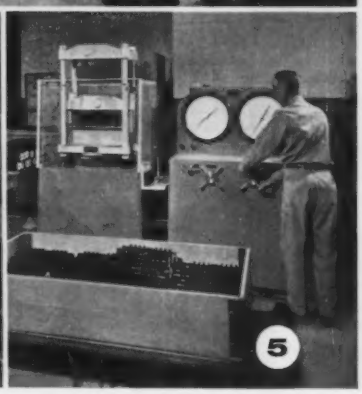
Representatives in principal cities of U.S.A.

D562

G&W



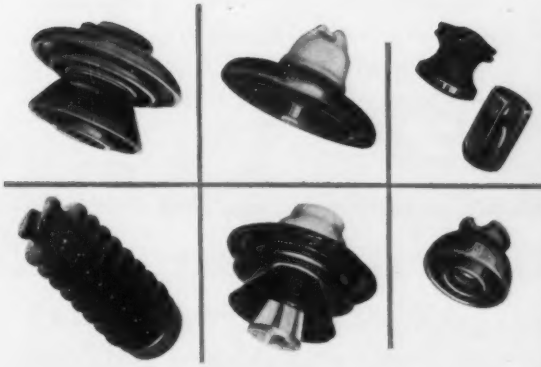




5 BIG REASONS WHY...

VICTOR GIVES YOU BETTER INSULATORS

1. Demand for VICTOR Insulators has necessitated a continual plant expansion running into many millions of dollars. In the last seven years alone, our plant area has been increased 20% to provide greater space for manufacturing, storage and research!
2. This impulse generator in VICTOR'S electrical laboratory, enables our engineers to perform steep front wave tests as well as standard impulse tests.
3. All processing water used by VICTOR is demineralized. VICTOR was the *first* in the industry to install water demineralizing equipment. A patent on our process is now pending.
4. To certify insulator soundness, VICTOR uses black light. Unfired insulators are sprayed with fluorescent material, then subjected to a near ultra-violet light source.
5. This hydraulic testing machine in VICTOR'S specialty porcelain department gives open cutouts and similar insulators a routine calculated transverse load before electrical test.



"BETTER INSULATORS THROUGH RESEARCH"

SPECIFY VICTOR

Purified Porcelain Insulators!

I-T-E

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain
Insulator Hardware

A question for every electric utility

CAN LOAD GROWTH BE HANDLED WITH LOWER INVESTMENT COSTS?

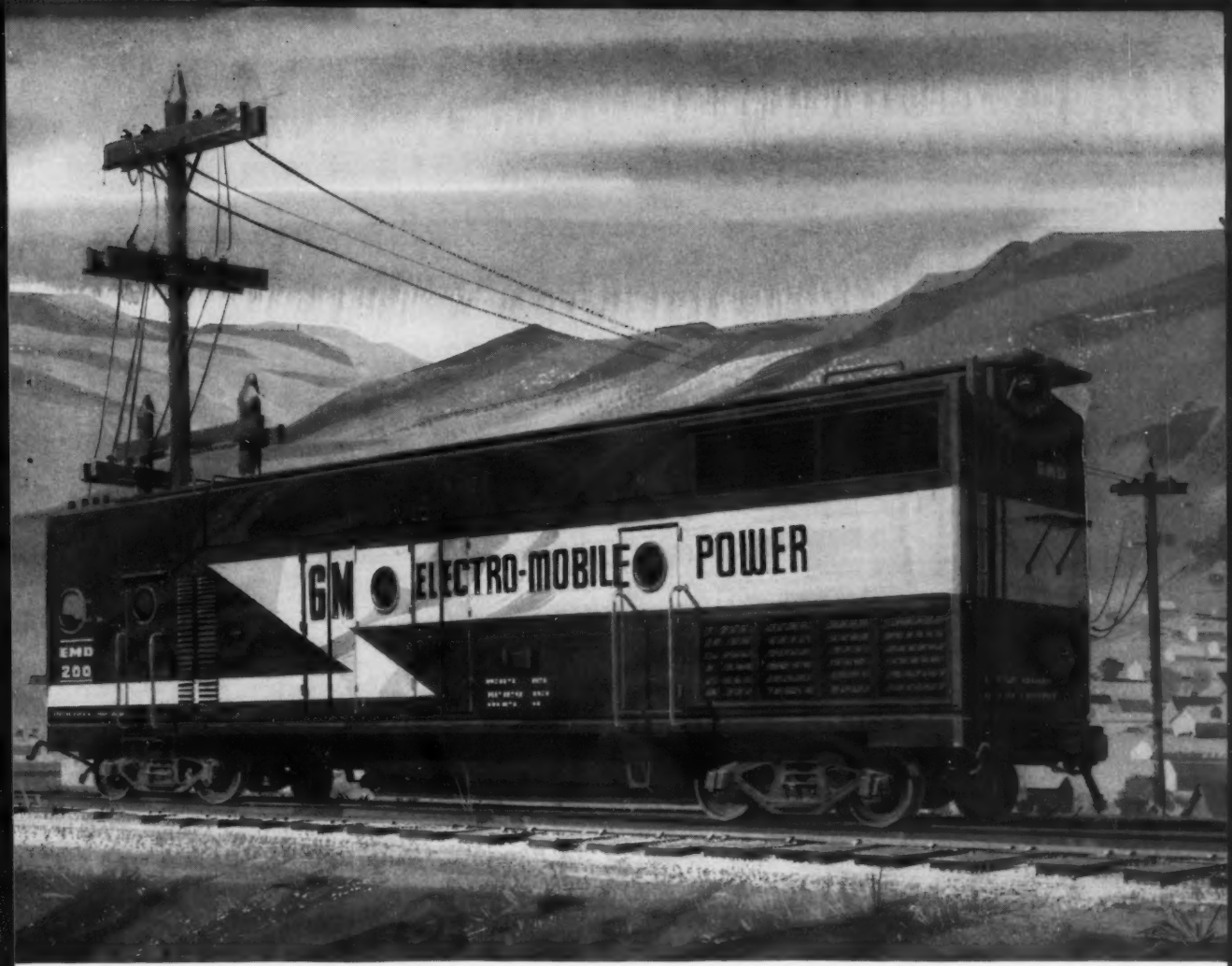
Our unequivocal answer to this question is, "Yes . . . and with greater power flexibility too."

Demand for electric power cannot always be controlled. Today's budding load growth area may well fall short of tomorrow's expectations.

The point is this: planning for increased power facilities necessarily precedes potential requirements by two to three years. Must, that is, unless a method can be devised that will permit the economic employment of units of power to handle load requirements as they develop, thus permitting a more realistic, longer-range selection of site and size for permanent installations.

Electro-Mobile Power provides the base for just such a program. It can be moved from one load center to another. It can be used in multiples to handle either building or diminishing demand. In short, it can follow the demand until such time as it becomes economic to build permanent facilities in the most advantageous location.

Can load growth be handled with lower investment costs? We think joint analysis of your own growth plans is the shortest way to an affirmative answer. Let's discuss it. Contact your nearest Electro-Motive representative for details.



As demand increases in the load growth area, Electro-Mobile rail units like this can be added or subtracted in 1000 kw increments to match power requirements exactly, at lowest cost. After demand has been established, permanent facilities can be erected in the most economical and desirable location. Electro-Mobile units offer the most advanced electrical engineering, equipment and controls. Rail units may be placed on sidings as shown here or mounted on piers for semi-permanent use.

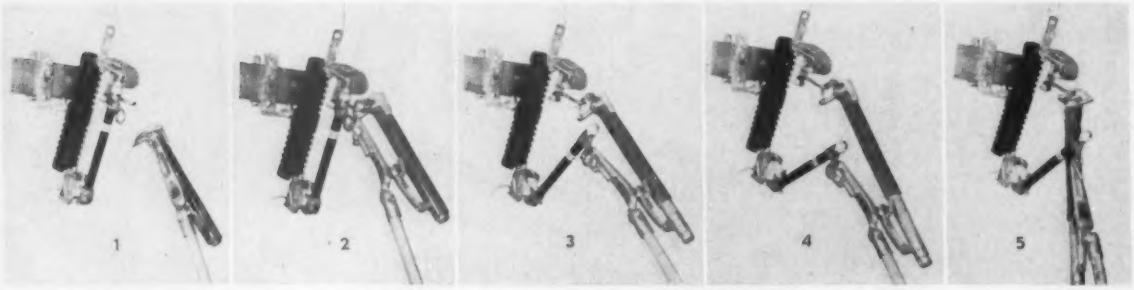
Electro-Mobile trailer unit is remarkably adaptable to many temporary uses because of its quick mobility. Trailer units have 500 kilowatt capacity.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS LA GRANGE, ILLINOIS

Sales Offices in Chicago, New York, St. Louis, San Francisco

PRODUCT NEWS

New Designs and Applications



Portable Loadbreak Tool

(1) S&C Electric Co., 4435 N. Ravenswood Ave., Chicago 40, Ill.

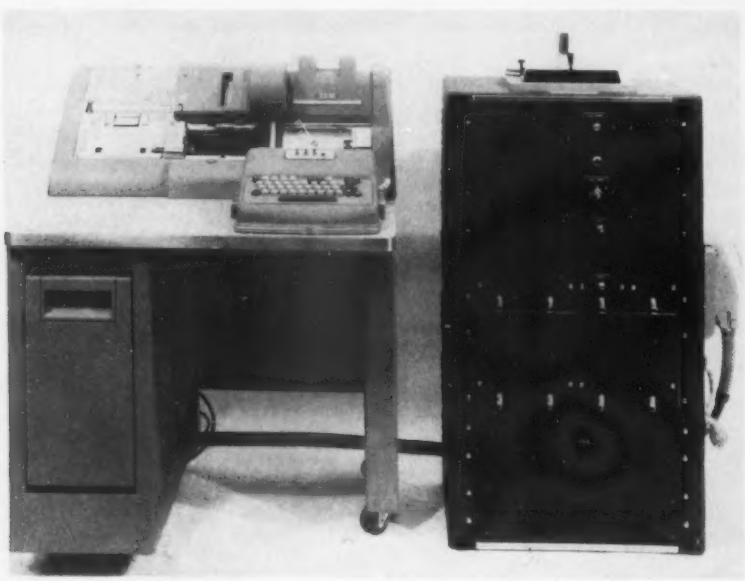
A new concept in load switching permits every disconnect and cutout on a system to operate as a load interrupter switch. The device used is called "Loadbuster" and is credited with the ability to safely open load currents with any number of switching devices.

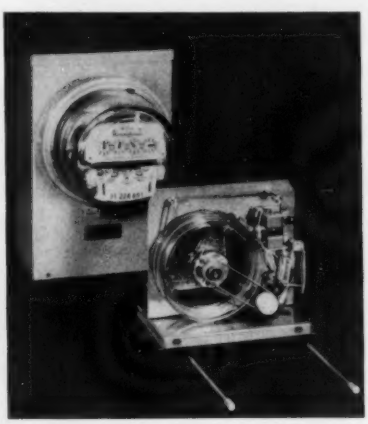
The portable tool has evolved from the load interrupter developed in 1939, but has the interrupter unit incorporated into a disconnect that is carried to the working point on a distribution system, used, then carried away. The economy is found in having only one unit for each line truck instead of one permanent installation for each distribution line point where interruption might be necessary.

Attached to a universal hot stick (see Fig. 1) it can be manipulated freely, approaching the disconnect or cutout from any angle. To break load, the tool is hooked across upper contacts of disconnect or cutout (Fig. 2) which is opened in the normal way (Fig. 3). Loadbuster trips (Fig. 4) as opening motion progresses, and is easily removed (Fig. 5) with the operation completed.

In the entire operation of using the Loadbreaker, there is no external arc, link breakage, contact burning or danger to the operator.

The tool provides arc-free circuit interruption at any distribution voltage through 14.4 kv, and is able to break all load currents through 400 amp, as well as associated magnetizing and charging currents. It can switch all pole-top capacitor banks.





Load Survey System

(2) Westinghouse Electric Corp., Box 2278, Pittsburgh 30, Pa.

In a radically new system for load surveying, survey data is transferred from a recorder installed at the customer's service to punched cards without any need for human interpretation. The survey system is comprised of a recorder that transcribes load and time quantities as impulses on magnetic tape, a translator that interprets these impulses as demand values, and a summary card punching machine that transcribes demand values to standard cards, prepunched to include basic survey information. The recorder is the only field equipment. The system was developed to fill a need for a reliable, accurate method of studying effects of increasing residential loads. It will give utilities data needed to foresee effects on system load curves.

Pocket Circuit Tester

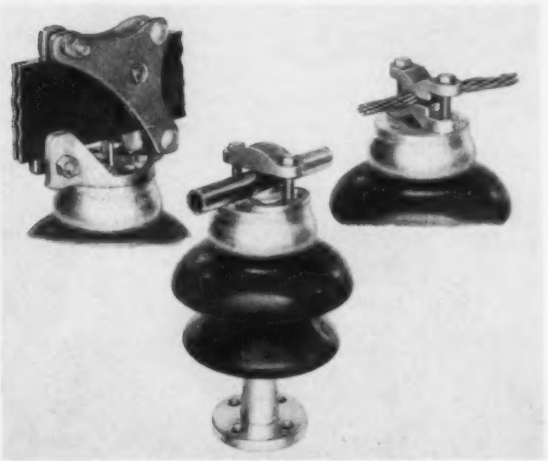
(3) Rodale Mfg. Co., Emmaus, Pa.

A chrome pocket clip and extended Bakelite case are new features of this company's tester. It is designed to test a-c or d-c currents from 110 to 550 v, with neon indication. Can be used to test live and ground wires in a circuit, open circuits, short circuits, blown fuses, defective resistors, static, polarity, etc.

Snap-on Conduit Strap

(4) Holub Industries Inc., Sycamore, Ill.

A new type of metal strap snaps on pipe, rigid and thin-wall conduit to make installation easier. Straps are in six sizes from ½ to 2 in. for thin-wall conduit, and seven sizes, from ⅜ to 2 in. for rigid conduit and pipe.



Bus Support Fittings

(5) Line Material Co., 700 W. Michigan, Milwaukee 1, Wis.

A new line of outdoor bus support clamps and fittings for use with cable, tubing or bus bar is being manufactured by this company. The new clamp line accommodates cables from No. 1 to 2,000 mcm, tubing from ½ to 2½ in. ips, and bus bars from 2 to 6 in. wide. The entire range of cable sizes can be handled by a clamp consisting of two similar parts, so only one part is stocked for all cable support requirements. Clamps can be furnished all ferrous, half ferrous and half bronze, or all bronze. They can be mounted upright or inverted on cap and pin or station post insulators.

Outlet Equipment

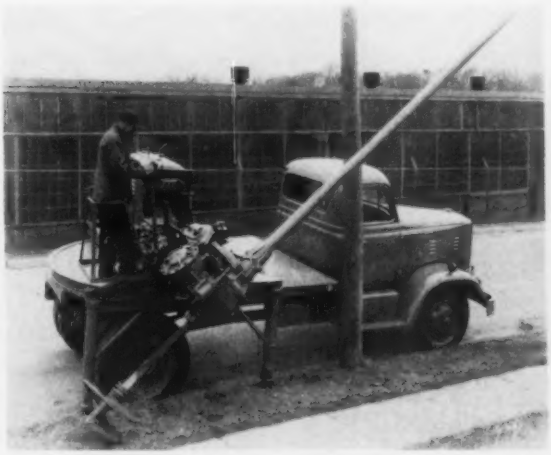
(6) Keystone Mfg. Co., 23328 Sherwood Rd., Center Line, Mich.

Time and labor savings are stated advantages of a new line of 3¼-in. octagon outlet boxes and box-bar combinations now available. Made of heavy-gage steel, the new boxes are the standard drawn 1½ in. deep. BX clamps are furnished for installing armored cable and flexible metallic conduit, Romex clamps for nonmetallic sheathed cable or flexible tubing. All clamps are designed with nested fit for faster pulling of wires.

Hydraulic Crane

(7) Powers-American Division, McCabe-Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.

This hydraulic crane is a 4,000-lb, truck-mounted unit designed for any chassis with a cab-to-axle dimension of at least 84 in., and requires only 20 in. of mounting space behind the truck cab. All movement is hydraulically actuated. Power is from a power take-off driven hydraulic pump. Can be used for setting poles, as well as for many other lifting jobs.



Earth Boring Machine

(8) Highway Trailer Co., Edgerton, Wis.

Operation at any angle is permitted by the hydraulic turntable base and swivel action of this new earth borer. It can be operated anywhere on a 180° arc without moving the truck. The machine is capable of digging holes from 9 to 36 in. in diameter and up to 10 ft in depth. Swing base allows borer to operate from either side of the truck. Can be equipped for pole setting with optional derrick.

Air Circuit Breaker

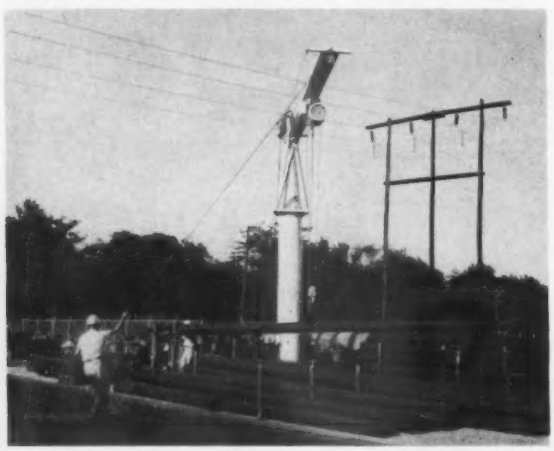
(9) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

A new metal-clad switchgear unit with a 13.8-kv magnetic air circuit breaker of 750-mva interrupting capacity is available from this company. It is designed primarily for use in protecting distribution circuits in large metropolitan substations. Has 50% greater interrupting capacity than the next lower rating of its type, but has same height and width and is only 6 in. deeper.

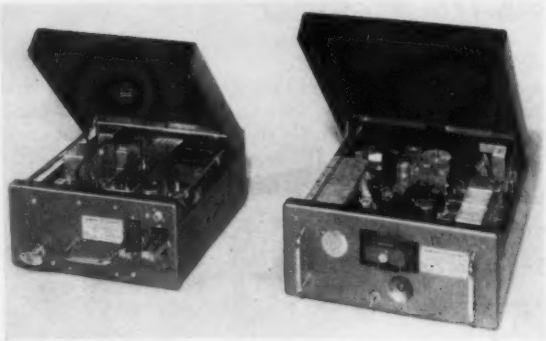
Light Control

(10) Tork Clock Co. Inc., Mount Vernon, N. Y.

Two Tork time controls are combined in one unit to make it possible to have lights go on automatically at sunset on any selected days of the week. Can turn lights off at sunrise automatically, or be set up to turn them off at a preset hour. Days can be skipped automatically, also, by insertion of a set screw on the control related to day or days to pass.



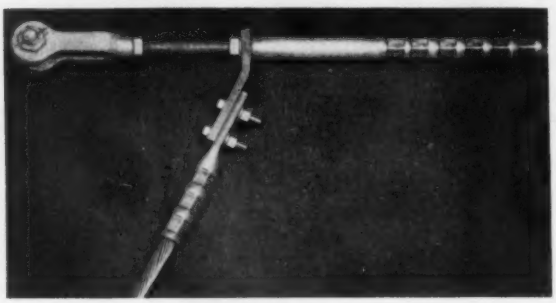
President Baxter Wilson of Mississippi Power & Light Co. says this four-ton LeTourneau crane, which cost the company $5,500, including accessories and installation, will pay for itself in two years. The handling of transformers, poles and reels of conductor is done "in a matter of minutes," according to Wilson. Jib cranes of this type are made by R. G. LeTourneau Inc., 2399 S. MacArthur, Longview, Tex. Free specifications are available on request



Two-Way Radio

(11) General Electric Co., Electronics Park, Syracuse, N. Y.

A new 450-mc two-way radio unit is now included as a standard item in G-E's Progress line. The new design is introduced because of a widening use of Citizens Band Radio by commercial enterprises. The unit will fit in a standard 14-in. Progress case, built for both truck and front mounting.



Adjustable Connectors

(12) Thomas & Betts Co., 36 Butler St., Elizabeth N. J.

Compression dead-ends for ACSR and all-aluminum conductors are now available with built-in adjustability. The new feature allows linemen to adjust conductor sag after the strain connection is completed. At assembly the ACSR is pulled through the dead-end body, and its steel strands are compressed in a steel sleeve that is integral with adjusting stud. The dead-end body is then threaded on the stud as far as the first of two lock nuts and locked in place. Sag is adjusted by loosening the rear lock nut turning the dead-end's U-shaped clevis to take up or pay out sag.

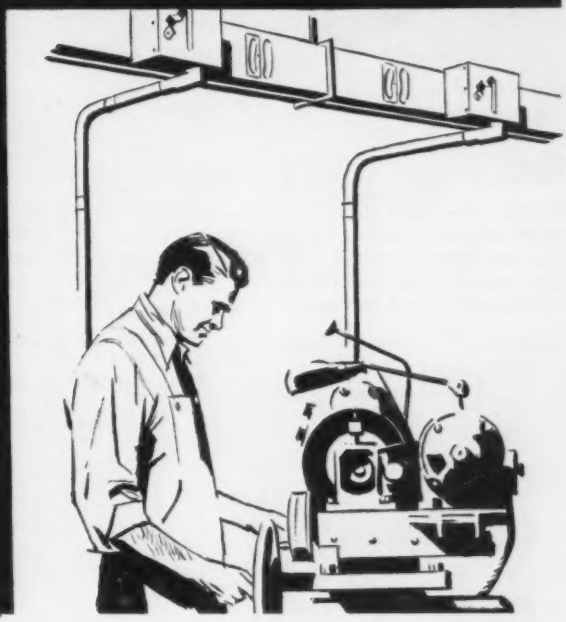
Baseboard Heater

(13) Marviray Inc., 54 Clifton St., Newark 5, N. J.

A new baseboard electric heater is offered by this company. The unit has an anodized aluminum heating surface. It is rated for operation at 750 w, on 115, 208, 230 or 245 v a-c. Finish is silvertone gray.

For Additional Information Fill in the Coupon on Page 73

FORD SAVES OVER 3,000,000 POUNDS OF CRITICAL COPPER



...you, too, can save by using BULLDOG ALUMINUM BUStribution Duct

Five years ago, visionary plant engineers at Ford Motor Company were among the first to approve aluminum conductors as an alternate for copper in BullDog BUStribution® systems. This enlightened thinking has now led to a savings of over *3 million pounds* of copper by Ford . . . permitting this critical material to be diverted to defense and other areas.

But saving copper is just half the story. Pioneered by BullDog, BUStribution Duct with aluminum bus bars costs less initially . . . is easier to install . . . operates with top efficiency and safety. Its lighter weight reduces the strain on building trusses and supporting members . . . makes it easier to relocate when plant layout must be changed.

Follow Ford's lead. Install BullDog "Lo-X"® and Plug-in BUStribution Duct with aluminum conductors in your plants. It's the modern, economical way to get flexible, efficient power distribution—and help conserve America's dwindling copper resources, too. Consult a BullDog field engineer or write to BullDog Electric Products Co., Detroit 32, Mich.

© BEPCO

IF IT'S NEW... IF IT'S DIFFERENT... IF IT'S BETTER... IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

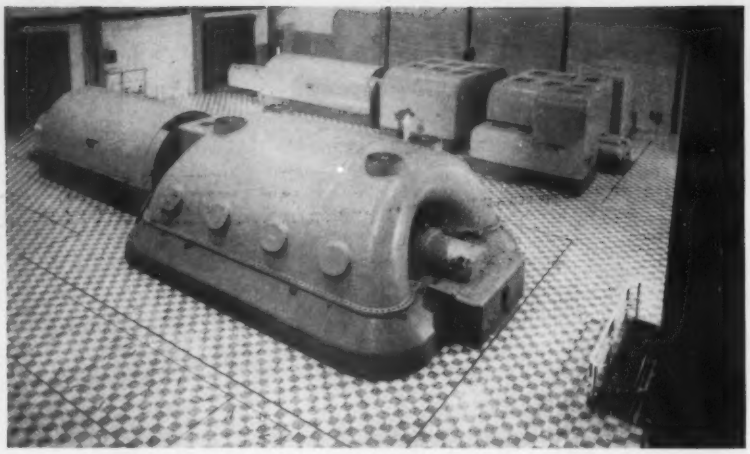
CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

COAST ELECTRIC & MANUFACTURING CO.
1733 N.E. Seventh Avenue, P.O. Box 7712
Portland 12, Oregon

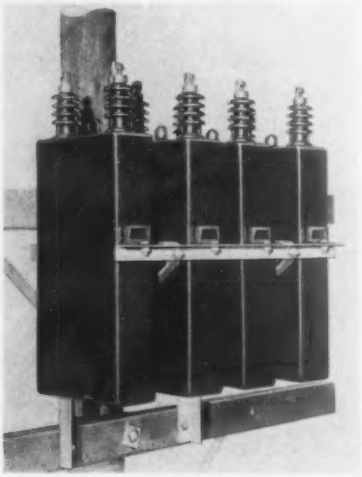
YOUNG ELECTRIC & MFG. CO.
2134 Curtis St.
Denver 2, Colorado

SAFETY SWITCHBOARD COMPANY
910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
Los Angeles 23, California



Pictured here is part of the installation at Ohio Valley Electric's Kyger Creek steam-electric generation station. The four Westinghouse 217,260-kw turbine-generators in the plant are important factors in earning for the plant the Federal Power Commission's report that it was the most efficient in the nation in 1955. It has a heat rate of 9,110 Btu per kwh, and the four units operate at 2,000 psig, with 1,050 F initial and 1,050 F reheat



Capacitor Hanger

(14) Line Material Co., 700 W. Michigan St., Milwaukee 1, Wis.

A new NEMA standard hanger by this company has the structural strength to support four 50-kvar units. It is made of heavy hot-dip galvanized steel, and provides interchangeable mounting for three or four 15-, 25- and 50-kvar units.

Pull-Down Fixtures

(15) Markel Electric Products Inc., 145 Seneca St., Buffalo, N. Y.

Polished brasstone is a new finish added to this line of adjustable pull-down fixtures. The fixtures are modern ranch style, and are UL listed.

Portable Threader-Puller

(16) Velocity Power Tool Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

A Lawco Jr. portable pipe threader is designed to do double duty as a cable puller, so one power tool threads conduit and then pulls wires through it. The same tool has been used as an auger for cutting channels for cable installation and as a winch for hoisting heavy terminal boxes and other equipment into position. It requires only a 110-v outlet for operation, weighs 20 lb, and is less than 27 in. long.

Mobile Speaker

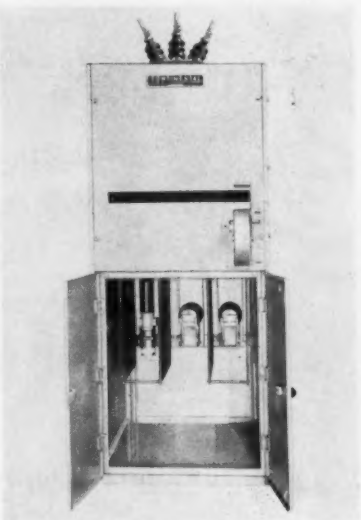
(17) Motorola Inc., Communications and Electronics Division, 4501 W. Augusta Blvd., Chicago 51, Ill.

Up to 10 times the audio output of standard passive mobile speakers is provided by this first transistor amplifier. Speaker element has a bandpass frequency response tailored especially for mobile service. Battery drain is very low. Unit is easily removed from inside mounting bracket and placed on vehicle window for remote monitoring.

Touch Action Switch

(18) Rodale Mfg. Co., Emmaus, Pa.

This new switch features a single rectangular touch button. It fits standard toggle wall plates and outlet boxes. Operation is on full line voltage with no special wiring, relays, transformers or mercury. It has silver contacts.



Air Interrupter Switch

(19) Continental Electric Equipment Co., 205 W. Fourth St., Cincinnati 2, Ohio.

Safe interruption at moderate cost is the manufacturer's report on a new air interrupter switch. It functions as an air break disconnect with continuous and interrupting ratings to 600 amp at 15 kv. Three front-operated three-pole types are available: single throw, nonfused, wall mounted; single throw, fusible, free standing; double throw, fused or nonfused, free standing. They are said to be easily installed indoors or outdoors.

For manufacturers' bulletins with additional information on these products, fill in coupon on page 73

GENERAL CABLE'S HIGH QUALITY CONTROL CABLE with IMPROVED COLOR CODING

To preserve the superior physical characteristics inherent in black neoprene, General Cable applies a colored synthetic rubber base coating supplemented, where necessary, by spiral striping over the black neoprene jacket of individual conductors.

This new, carefully developed method of color coding the individual conductors of multiple conductor cable results in superior quality, brighter colors and an extra tough coating for permanence.

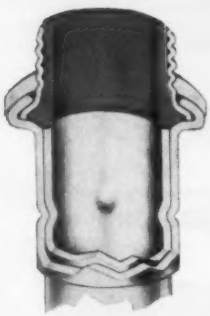
Station, Traffic, Elevator and Railway control cables are color coded in accordance with IPCEA Standard color sequence and to customer's specifications.

GENERAL CABLE CORPORATION,
420 Lexington Avenue,
New York 17, N. Y.
Offices and Distribution Centers Coast-to-Coast.

for quality and service . . . **specify GENERAL CABLE**

B-M INDENTER TYPE FITTINGS FOR E.M.T. Concrete-tight

Red Throat
Insulated
Connector



Red Throat
Cross section

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job.

All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

UL

BM TELESCOPE SYSTEM

BRIEGEL METHOD TOOL CO.

GALVA • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

SALES AGENTS FOR THE ELEVEN WESTERN STATES

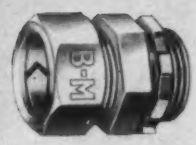
Ernst Hauch
1282 Folsom Street
San Francisco 3, California

Rutkin Electrical Sales Co.
935 Stanford Avenue
Los Angeles 21, California

L. D. Hood Sales
1133 West 8th Avenue
Denver, Colorado

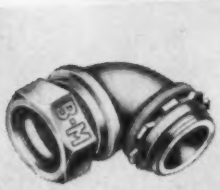
W. W. Wheat & Son
2219—4th Avenue
Seattle 1, Washington

B-M COMPRESSION TYPE FITTINGS FOR E.M.T. Rain-tight



SIZES FROM ½" to 2"

SIZES FROM ½" to 2"



SIZES ½" ¾" 1"

SIZES ½" ¾" 1" 1¼"

SIZE ½"

BRIEGEL METHOD TOOL CO.
GALVA • ILLINOIS

BULLETINS ETC.

(20) TRANSFER SWITCHES—Publication 596 of Automatic Switch Co., 391 Lakeside Ave., Orange, N. J., gives 10 factors to consider in selecting automatic transfer switches. Additional information includes selection of type, how to specify switch capacity, calculating line currents, and suggested specifications for automatic transfer switches.

(21) POWER PLANT CONTROLS — Instrument and control panels for power plants, tubed and wired for "plug-in" installation, are described in product specification G71-7 by Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, Ohio. Six standard designs and their accessories are illustrated in the 16-page booklet.

(22) WIRING DEVICES—A new 72-page catalog illustrating more than 1,400 electrical wiring devices, lamps and specialty products has been issued by Eagle Electric Mfg. Co., 23-10 Bridge Plaza South, Long Island City 1, N.Y.

(23) RACEWAY INSTALLATION — "Installation Guide for Plastic Coated Raceways" is the name of a booklet available from General Electric Co., Construction Materials Division, Bridgeport 2, Conn. It contains step-by-step illustrated installation details recommended for obtaining maximum protection and efficiency from plastic coated rigid steel conduit and electrical metallic tubing. Ask for publication No. 18-166.

(24) PIPE PUSHING—A manual entitled "Power Pipe Pushing" is available for users of Mercury Hydraulics Inc. "Speed-Thru" hydraulic pipe pushers and others, and is said to be universally applicable. The methods shown can be used with most pipe pushers. Write to the company at 2440 Blake St., Denver 5, Colo.

(25) ILLUMINATING DESIGN—A new 48-page booklet available from Westinghouse Electric Corp., Lamp Division, Bloomfield, N. J., is designed as a basic reference for designers of interior lighting installations. It contains a detailed listing of illumination levels recommended for many applications, basic design techniques and methods, and performance data for a wide variety of lighting equipment. Request booklet A-4854.

(26) AUTOTRANSFORMER — Ways to use the Handi-Auto transformer to help solve voltage correction problems are told in a bulletin available from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee 1, Wis. Diagrams of useful connections and mechanical information are given. Bulletin is 61B8490.

(27) SPERO CATALOG — Spero Electric Corp., 20500 St. Clair Ave., Cleveland 17, Ohio, has published a 52-page catalog of its industrial and commercial lighting fixtures and materials for electrical construction.

(28) OUTDOOR HEAT CONTROL—A chart scheduling the most suitable "outdoor" controls for use with different types of heating systems under varying conditions and requirements has been prepared. The chart and "guide specifications" are available from Automatic Devices Co. Inc., 714 Hillgrove Ave., Western Springs, Ill. Ask for No. N-756.

(29) LUBRICATION—The Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn., has published its second Lubrication Newsletter. Pressure lubrication on a steam turbine is reported in this issue.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after January 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

CITY..... ZONE..... STATE.....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

The transformer that

"You can't test transformer life by just testing insulation," says A. M. Lockie, design engineer, who has developed the unique, new concept of functional life testing of distribution transformers at Westinghouse. For full description, see Lockie's AIEE papers, *Functional Life Expectancy Tests for Liquid-Filled Transformers* (55-520 and 53-243).

ACCELERATED LIFE-TESTS-TO-DESTRUCTION PROVE 20% INCREASED OVERLOAD CAPACITY OF WESTINGHOUSE TRANSFORMERS SAVE UTILITIES OPERATING DOLLARS

The new Westinghouse transformers already have a lifetime of success behind them. How is that possible? Through a revolutionary new concept of proving performance . . . a new concept in determining transformer life. This means that the new Westinghouse Type S and CSP® transformers have demonstrated in advance a phenomenal life expectancy in service.

Normal breaker settings on Westinghouse CSP transformers have been increased 20% — an additional 15% in the emergency range. The functional tests have demonstrated that this major increase in load capability has been achieved without sacrifice in normal life expectancy...an exclusive Westinghouse development.

What is behind Westinghouse functional life testing? Even more than three years . . . today's life-testing procedures are based on experience obtained from subjecting transformers to 2200 overloads, 30 short circuits at 15 times rated current, a series of impulse, dielectric and induced potential tests, and daily load cycles up to 450% of rating. Only Westinghouse can offer you a transformer with a pre-tested life.

lived 30 years in 3...

Proof? Here is proof never before applied to a distribution transformer. Complete transformers — not insulation alone, or subassemblies — but complete units have been put through repeated cycles of overload up to 350% of rated load. These tests were conducted under conditions representative of actual service. Aging was accelerated 10 times; 30 years of "normal" life were packed into three. Without a single failure, these transformers also survived periodic impulse, short-circuit and low-frequency dielectric tests.

And check-on-check proof . . . 10,412 Westinghouse transformers have operated successfully up to three years at the higher operating levels on distribution lines of three utilities in New York, Missouri and Texas. In 1954, 1955, 1956, these transformers lived through not only tough load cycles but also severe heat storms — and still delivered a caliber of service never equaled in a transformer.

The result? Reliability of Westinghouse transformer ratings has been conclusively established. This is "functional life testing" at Westinghouse. By giving a few transformers a short and rugged life test, Westinghouse can assure you that the many you buy will have a long and predictable life . . . give you long and dependable service. Specify Westinghouse.

Call your Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-70777-X

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

ELECTRA'S HUSBAND

"Tomorrow Will Be Different"

"IF all trips were as interesting as this one, I wouldn't mind you taking me along on a business junket and then try to sell me on the idea that it was my vacation," said Electra as we were packing up to return home from a recent convention.

"Conventions are a good thing," I stated judiciously. "They give people a chance to exchange ideas as well as to get caught up on the latest new developments. It's good for you to come along once in awhile just to see how much punishment the businessman's stomach has to take in order to keep him educated. I will admit that this convention did have a particularly thought-provoking program."

"I'm impressed about that very thing," replied Electra, "and I'm beginning to get a glimmer of the reasons why you keep saying that the electrical industry is going to double in size in the next 10 years. Until I heard some of those speeches and went on those inspection trips with you I just didn't see how it could be possible."

"It's not only possible but very probable. Do you remember that speaker who said that every projection that has been made concerning the growth and the use of electricity in the past had underestimated its actual expansion, often by a considerable margin? If it's very much on the low side in this next 10-year prediction, the manufacturers will be in real trouble trying to produce electrical equipment fast enough."

"Somehow, I got the impression that power applications were moving ahead faster than ever on all fronts. Of course, being a woman, I really enjoyed the talk about the things that are coming for the home of tomorrow. If what they say about supersonic cleaning, dustless atmospheres, beds without blankets and built-in health rays are true, our kids will look back and brag about the primitive way their parents lived back in the fifties."

"That's all very nice, Electra, but those things are only a part of the picture. Adding all these new consumer products to our present standard of living means a big expansion in the whole productive base of our economy. I thought some of the other speakers brought that point out rather well."

"I did too," Electra agreed. "In fact I was intrigued with the comments of those two men who talked about the requirements for materials that we will need in the next few years." Electra continued to pack as she talked on. "Of course, everybody knows that the population is increasing very rapidly but it was rather startling to learn that the scientists figure that we will need twice as much in the way of materials each year by 1975. It's not only the quantity that staggers the imagination but also the fact that so many of them will be entirely new and different from those that we know now.

"That Air Force general who talked about intercontinental missiles traveling at twenty times the speed of sound gave everybody something to think about. Imagine engines operating at temperatures of 2,500 F. I thought everything melted at that temperature," concluded Electra.

"Practically everything we know now does," I said, "but that trip to the government's new cyrogenics laboratory ought to have given you a glimpse at just what varying approaches the reseachers are taking to develop all of the things that will be required tomorrow."

"That was a fascinating trip," agreed Electra. "It just seems incredible that it might be necessary to treat metals with intense cold in order to make them suitable for operating at intense heats. Incidentally, that seemed to be a mighty big plant to produce some rather small quantities of liquid oxygen and nitrogen."

"Maybe so," I commented, "but that's only just the beginning. Low-temperature research is one of our newest sciences and it's liable to lead into a whole new area of low-temperature processing on a commercial scale for all kinds of products such as missile fuels, metallurgy, special plastics and a host of other things that we've known for a long time we could use but didn't know how to make."

That comment set Electra off on another train of thought. "Speaking of plastics," she said, "the speaker who talked on organic chemistry certainly opened up my eyes. I don't think I ever heard a better layman's discussion of just what science is doing to supplement the supply of scarce natural resources. It's hard to realize that so many things could be made just by rearranging combinations of the hydrogen and carbon atoms."

"The whole subject is as practical as it is interesting and is going to play an increasingly important role, even in our lifetime. It's almost magical the way that they can take plentiful things like limestone, carbon and components of natural gas, and by irradiation, catalytic action or low-temperature processing turn them into everything from stockings to structural members."

"There's just one thing that you left out," smiled Electra, "and that is the essential ingredient of electric power."

"I didn't leave it out intentionally," I protested. "I just fell into the common error of assuming that everybody recognized that electricity is just a natural part of everything we do today and will be doing tomorrow—only tomorrow it's going to be much more so.

"Have you ever thought that every day it takes a little more raw materials, food and services to supply the people of the country; that every day it's just a little more difficult to secure them?"

"I think I get the point," said Electra. "As we use things up, we have to dig deeper, drill down farther, find new deposits in more remote areas and haul more tonnage farther. And then, when something gets really scarce, we have to devise a substitute."

"That's right, and developing both substitutes and the new products that are needed involves industrial processing in hundreds of new, different and complex combinations.

"Most of these new processes not only are heavy users of electrical energy but, more important still, many of them run 24 hours a day. When you add up more people, more products, more processing and more pay checks through increased productivity, you can come up with only one answer. That is, the crystal ball can't be far wrong in its predictions of vast expansion in electric utility services."

Electra always is practical. "At the risk of having you cut my allowance, I'll admit I have a few dollars salted away. Want to take a flyer with me in Western utility stocks?"

Quality Control at Allis-Chalmers

Checks prevent "Heart Trouble" –mean better transformer performance

● Measuring the dimensions of the coil — the "heart" of a transformer — is step number one at this inspection stage. Compactness of coil and accuracy of dimensions help assure meeting insulation and performance tests.

Cooling ducts are important — so the size, number and location of spacing sticks that form the ducts are checked. In addition, ducts must be clear.

Quality control like this, combined with the finest in materials and workmanship, pays off in performance.

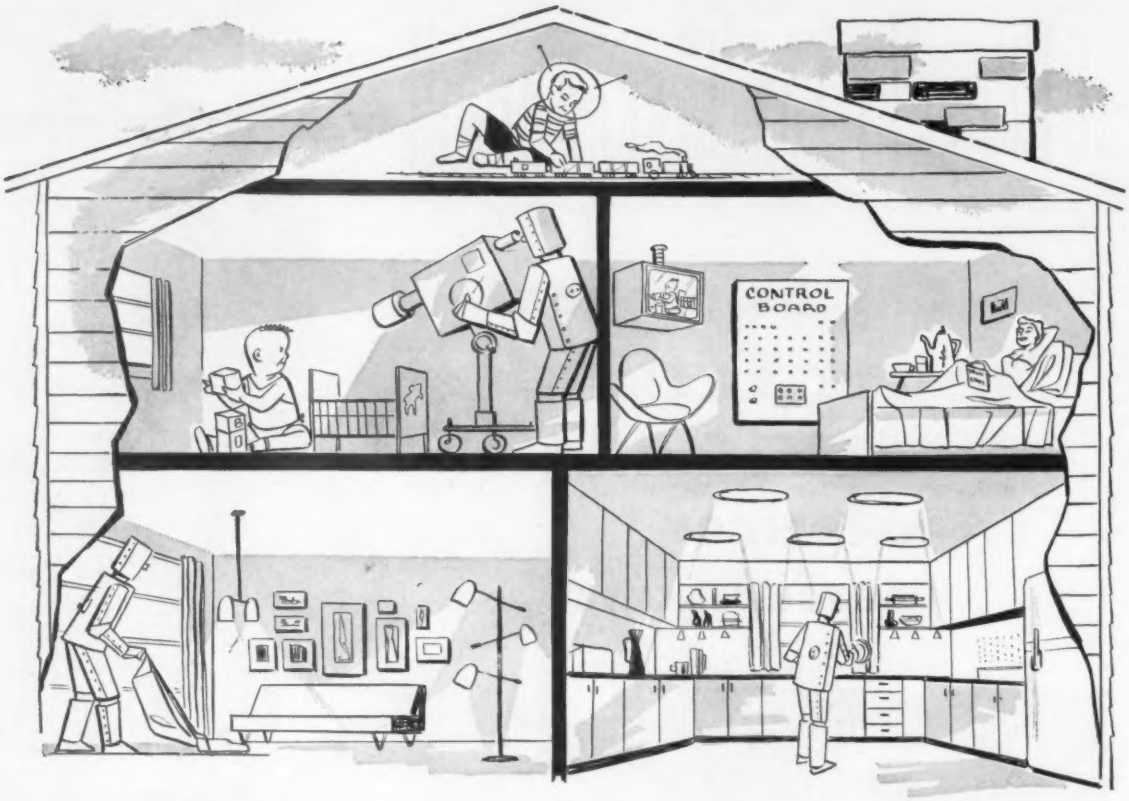
GET NEW BULLETIN, *61B8355, for the complete quality control story. Ask your nearest A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.*

LIVE BETTER ELECTRICALLY

A-C ALLIS-CHALMERS

A-5046

ALLIS-CHALMERS



This "Fantasy" may be closer than you think

Is Your Distribution System Ready?

Is the idea of an all-electric home really so fantastic? It's possible right now to install economical electric space heating, entire walls that light up and ceilings that begin to glow automatically as the sun goes down, and television systems that help mother baby sit without running all over the house. The next step probably should be an electric paddle to help enforce discipline by remote control.

A key to the rate of residential load growth is the capacity of the distribution system. That's why many far-sighted companies are constantly rebuilding deadends . . . to get ready now for the higher voltages that are sure to be needed.

Your local Graybar house is ready to work with you. It has the O-B insulators and hardware needed for a forward-looking program, one that calls for as many as three six-inch suspensions at every deadend. Saving you the trouble of maintaining large warehouse inventories, Graybar can be an important ally in the race to stay ahead of rising residential loads. You can depend on Graybar to have O-B materials available when and where you need them.

OHIO BRASS COMPANY • MANSFIELD, OHIO

Ohio Brass

Distributed by Graybar Electric Company

4680-H

ELECTRICAL WEST SALES GUIDE © NOVEMBER 1956

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

Sleep better electrically

To "sell the real sleeper" in the electric housewares field, Northern California Electrical Bureau will sponsor a big blanket promotion this fall. An introductory rally for distributors in San Francisco, Oct. 15, is being followed by retailer rallies during October and November. PG and E will back up dealer effort with advertising and bill inserts, as well as poster boards and truck cards of attractive and colorful design. At the Oct. 15 rally, emceed by LeRoy Hubert, John Oster Co., and chairman of NCEB's Electric Housewares Section, Bert Reynolds, bureau manager, and Jack Ross, PG and E, stressed the distributor's part in putting over the sale of this big ticket gift item. Size of the market potential was brought out by Carl Leppel of Landers, Frary & Clark, who pointed to the 11.4% saturation; stated that 40,649,000 units remain to be sold in the wired homes of America before there is even one to a home.

How to make profits

Profit Clinics staged by local units and affiliates of NARDA brought out nearly 1,000 appliance dealers in Phoenix, Bakersfield and Seattle. (See p 115.) Selling problems and opportunities were weighed by speakers, several of whom covered all three meetings. Continuation of the trend toward specialization in one or two full appliance lines was foreseen. Looking to the future of TV, one speaker prophesied that by 1963 all transmission would be in color.

Down to business

"Let's talk business," keynoted the program for NAED's Western Convention at Phoenix. (See p 135.) Concensus was that supplies distributors must continue to sell the importance of their function to the industry but at the same time they must pay close attention to how well they are performing their function.

Record year coming up

A year of opportunity and strong competition is just ahead, Kimball Jack, WWP vice-president, said in his keynote talk at the Inland Empire League's ninth annual Shindig in Spokane. Pay rolls, capital investment and public works projects will reach all-time peaks next year, he believes. Population is booming, buying power will be at a record high, he pointed out, and competition for the customer dollars will be keener than ever. Industries planning to avoid the soft spots that do appear are giving closer attention to sales methods, he reminded the group.

Drive for range sales

Electric range sales in southern California are getting a big boost from both major electric utilities in the area. Southern California Edison and the Department of Water & Power have announced dealer cooperative campaigns to push this item. Edison is offering free trips to Hawaii and outings in the High Sierra as prizes in a dealer range sales contest ending Nov. 30. The contest is part of an intensive 15-month advertising and promotional program tying in with the Live Better . . . *Electrically* program (EWEST, September, p 140). The department's recently announced electric range campaign of 1956-57 includes 10 theater-size electric cooking shows, dealer helps, displays, a new Cost of Operation Calculator. Details will be given next month.

Pays off

Hawaiian Electric's long range plan to build business for the territory and therefore for its utilities is paying off. Most recent success was the incorporation of Kentron Hawaii, a TV tube manufacturing business that will be operating by the end of 1956 and at full capacity in six months. The company's formation is a direct result of Heco promotion work.

Westerners on board

Glen Logan, managing director of the Los Angeles Electric League, was made vice-president of the International Association of Electrical Leagues at its recent Detroit conference. **Bert Reynolds**, director of the Northern California Electrical Bureau, was made chairman of Division IV and a member of the group's Board of Governors.

Honors to San Diego

For the second successive year, San Diego Bureau of Home Appliances was awarded top honors in the National Award contest sponsored by NEMA's Housewares Division. It received a gold plaque as the league making the most outstanding contribution to the industry's electrical housewares promotion campaign. Award was made to Secretary-Manager Clark Chamberlain at the IAEL annual conference in Detroit. Carl Fisher was chairman of the San Diego bureau's housewares committee which sponsored the promotion.

Electri-Living at Fresno

Approximately 4,000 people went through Fresno's Electri-Living Home on the first day of its public showing. Sponsored by *Living for Young Homemakers* magazine, PG and E, American Institute of Architects and the Fresno Home Builders Assn., the home will be open for inspection for 60 days.

Utility on TV

Pacific Gas and Electric Co. will start a weekly TV program in January. To be produced in Hollywood, the series is a one-half hour film telecast of the best of O'Henry's short stories. It will be shown on eight stations covering PG and E territory. Commercial time on the program will be used to promote modern home lighting, new home appliances and full Housepower for today's living.

Junior Award

The Live Better . . . Electrically insignia is a part of the design of the Junior Homemaker Award certificate that Sacramento Municipal Utility District is giving to young people. The certificate states that the recipient has completed the prescribed course of study in meal planning and cooking and is qualified for the Award of Merit.

Freezer Leisure

WWP's Freezer Leisure campaign had netted 1,232 unit sales by Sept. 1. This was 61% of quota. In Lewiston, where hot weather gave a hand, the score was 113% of quota at the two-thirds point.

Fair promotion

Arizona Public Service Co. is featuring lighting and electric cooking in the patio at the State Fair, which opened Oct. 29. Ruth Kruger, home service director, will be a judge in the fair's cooking contests.

Every week

As a refresher for homemakers in the Phoenix area, Arizona PS is conducting weekly cooking classes until Dec. 18. For those who cannot attend the Tuesday afternoon classes, Wednesday morning sessions have been arranged. Emphasis is on cooking for the fall season—after-the-game snacks, holiday meals, etc.

Still climbing

Factory sales of home laundry appliances are still climbing, according to AHLMA. August sales were up 4% over July and for the first eight months of 1956 the gain was 9% over the corresponding period last year.

Record on TV

Surveying TV sales in its area, the Electric League of Los Angeles reported that the month of August showed a record distribution of 33,504 sets. The figures top any previous month this year and are a 50% increase over July. According to Glen Logan, managing director of the league, 2,545,399 sets have been distributed in the Los Angeles signal area.

Fair Trade out in Utah

In a unanimous decision the Utah Supreme Court ruled the state Fair Trade law unconstitutional. The opinion was handed down on appeal from a district court decision in the case of General Electric vs Thrifty Sales Inc. of Salt Lake City. In its ruling the high court pointed out that "insofar as the nonsigning merchant and the public are concerned the act so operates that the agreement of the manufacturer and one dealer does establish the price at which the manufacturer's product must be sold in the area"; therefore must be regarded as price fixing and invalid under the Utah constitution.

Life in 1976

Living Unlimited has been released by Frigidaire and is available free of charge for group showing. Running 13½ minutes, this film combines animated cartoons portraying life 20 years hence with full color live action shots in the kitchen of Today and Tomorrow. The film may be secured from Frigidaire's branch offices.

Make it electric

National promotion will again urge electrical gifts for Christmas. **EEI** has announced its Fall Gift Campaign, carrying the slogan "Make it a Merry Christmas with Electrical Gifts." A 10-piece display kit is offered utilities and dealers to tie-in with the November-December campaign . . . **United States Steel** is repeating its Operation Snowflake. It will use the theme, "Make it a white Christmas—Give her a major appliance" on TV and radio and in newspaper and magazine advertising. Industry tie-in is invited.

10-year forecast

on laundry equipment . . .

on ranges . . .

on water heaters . . .

on refers . . .

on air conditioners

Hotpoint has released its 10-year forecast on the major appliance picture. Here are some of the findings. Industry sales of **automatic washers** will reach about 3,250,000 units in 1956, of which about 32.3% will be replacements. Saturation is expected to be 32.4% based on 47,100,000 wired homes. By 1960 the automatic washer market will be primarily a replacement market. The **automatic dryer** market will become a replacement market sometime after 1966, according to the survey. For the 10-year period the industry is expected to sell more than 19,000,000 units. On the **combination washer-dryer** sales should reach 1,281,000 by 1966, with replacement market beginning in 1957. It is expected that the industry will be selling nine times more washers and four times more dryers than the total combination sales by 1966. Sales of **free-standing electric ranges** are expected to total 1,254,000 units in 1956, in excess of 16,000,000 in the ten-year period. **Built-in ranges** will account for nearly 325,000 units in 1956 and 1,000,000 units by 1966. Present saturation is about 2% for the built-ins; 27% for the free-standing ranges. **Water heater** sales in 10 years will add about 13,000,000 units; there will be 7,913,000 in use by the end of 1956, 13,637,000 in 1966. **Refrigerator** sales will total about 3,700,000 (54.5% replacements) in 1956 and about 5,500,000 (80% replacement) by 1966. **Air conditioner** sales will rise to 1,600,000 units in 1956, 2,700,000 in five years and 3,900,000 by 1966. Of the 1956 total only about 10,000 will be replacements; in 1966, 496,000 units will be replacements. There are about 4,191,000 air conditioners in use today. It is estimated that this will rise to 12,301,000 in 1961 and 25,096,000 in 1966.

Lighting education

For the second year, the Better Light Better Sight Bureau will offer the Lighting education award for activities by utilities to foster a better public understanding of the relationship of light and sight. A parallel award covering sales promotion is being sponsored by three lamp bulb manufacturers.

Details requested

FTC has asked NARDA to supplement its recent charge of unlawful price discrimination with specific examples. In a letter to the commission NARDA had stated that builders were being favored over dealers and that builder merchandise was being diverted into retailer channels.

Another merger

Merger of McGraw Electric Co. and Thomas A. Edison Inc. has been approved by directors of the two firms, and must now go before stockholders. The consolidated company would be named McGraw-Edison Co.

Things to come

Ampex Corp. is working on a **color video tape recorder** and reports that it may have the equipment available in 18 months . . . **A magnetic tape player** that reproduces TV programs through standard TV sets has been developed for the home by RCA.

News of people

William F. Cranston was elected president of A. J. Lindemann & Hoverson Co. of Milwaukee, a subsidiary of Norris-Thermador. He will continue as president of Thermador Electrical Mfg. Co. and first vice-president of Norris-Thermador . . . **R. F. MacGillivray** has been appointed Pacific Coast regional sales promotion manager for Westinghouse major appliances. He has been with the manufacturer's Appliance Division for 10 years, most recently as southern California district manager of major appliances. He will be succeeded at Los Angeles by **William J. Livermore,** San Francisco, formerly regional finance manager for consumer products.

From Hawaii

"Geoff" Geoffroy, who has been with Easy Appliance in Honolulu, has been made director of wholesale sales for Electrical Distributors Ltd., which handles RCA, Whirlpool home appliances, Motorola TV and other lines. He has been in the Honolulu appliance field for several years; is a member of the Electric Living Committee of the Hawaiian PCEA . . . Walton's TV and Appliance has opened its third branch in Honolulu. Jack Walton is owner of the stores, which handle Norge appliances; RCA-Victor TV and radios . . . For the fourth consecutive year **W. A. Ramsay Co.** has won membership in G-E's 21 Club.

Easy makes appointments

Changing over to a distributor representation across the nation by Easy Washing Machine Division of the Murray Corporation of America has resulted in appointment of four distributors in the West. Ry-Bar Distributing Co., Portland; Lenihan Co., Seattle; Thompson-Holmes, San Francisco; and Graybar Electric Co., southern California, have been named so far. Graybar also has the line in Phoenix, but this is not a change. Jack West, Easy's representative in San Francisco, will continue his duties for the manufacturer with a staff that is already reduced to fit the new pattern.

Comes to BCE

A recent arrival from England has replaced Joyce McCutcheon as home service adviser for British Columbia Electric Co. Miss McCutcheon has taken a position in home service work in Amarillo. The newcomer is Rita Clatworthy, a former home economics teacher and catering organizer.

New quarters

D. E. Sanford Co. is in new quarters on the second floor of the Western Merchandise Mart, San Francisco. Offices and showroom utilize six Mart spaces.

Will keep S. F. office

San Francisco will continue to have a regional office, **Hotpoint Co.** reports, though regional offices in New York, Chicago and Atlanta will be closed. Local distributors assume full responsibility for marketing and servicing, with field assistance available from the factory at all times. Distance from headquarters justifies maintaining the San Francisco regional setup.

Appointed

Public Distributing Co., 1520 Wazee St., Denver, is a new distributor of the Quicfrez line of refrigerators and freezers.

Time to enter

Now is the time for dealers to enter competition for the Brand Name Retailer-of-the-Year Award offered by Brand Names Foundation. Primary consideration is given to the accomplishment of the firm—not the amount of money spent. Entries must be received by the foundation by Jan. 14. Entry blanks and fact sheets are available from Brand Names Foundation, 437 Fifth Ave., New York.

Now on the surface

Westinghouse has announced an electronic cooking surface unit. The device is part of a new electronic cooking center that also contains an electronic oven. The surface unit consists of a ceramic bead no larger than a pinhead and two platinum-iridium wires only 4/1,000-in. in diameter. Called a thermistor, it is a heat-sensing device that controls the amount of heat applied to the bottom of the cooking pan. The same device will be featured on the 1957 line of ranges.

Combination is popular

Production schedules on Emerson's portable TV-phonoradio were hastily reshuffled after the initial introduction brought more orders than was anticipated. The $124 combination unit has an 8½-in. screen, is a radio receiver, has a phonojack for record playing and operates in an auto.

Square corners

Several models of the 1957 Westinghouse refrigerators have square corners instead of curved edges. Square edges are said to help give a built-in look.

Pink Christmas

It may be a pink Christmas. Westinghouse is producing pink Christmas tree bulbs to go with the pastel decorations coming out this year. The pink bulbs will be available in indoor and outdoor types.

Hay fever relief

Philco is going to produce room air conditioners that generate negative air ions for the relief of hay fever. The negative ion generator in combination with an air filter will be called "Ionitron."

Record promotion

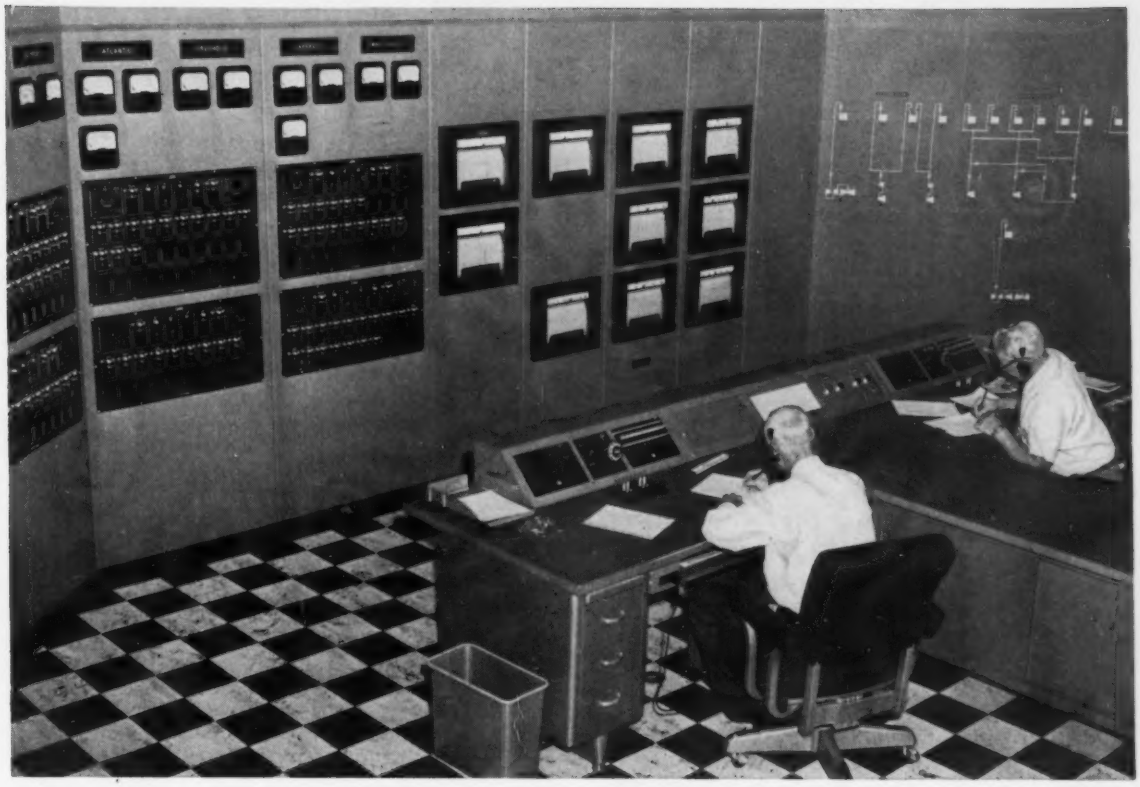
Voices of every president of the United States since 1896 are on a 12-in. LP record that Hotpoint dealers will have to give away to customers. The company is putting the finger on election interest to boost TV receiver sales.

Sunlamp push

General Electric is setting up a big sunlamp sales push for December and January. National popular and trade magazine advertising and TV commercials are planned, plus paraphernalia for store displays, distributor meetings, etc. A new "Sunny" trophy will be given to outstanding salesmen.

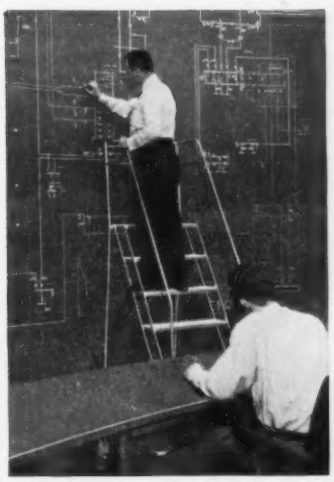
Fans on hand

A comparatively cool summer has left 122 wholesalers holding a sackful of more than 50,000 household fans valued at more than $1,000,000, according to the National Association of Electrical Distributors—and the new season will probably bring out new models. Kitchen, exhaust and ventilating fans are not included in the report.



This new Systems Operations Center of the Jersey Central Power & Light Company keeps in touch with remote stations through Bell System channels for telemetering and remote control.

Bell System communications help Jersey Central regulate power transmission



Colored pegs in wall diagram indicate segments of line to be isolated for maintenance work.

Channels for telemetering and remote control enable the Jersey Central Power & Light Company to regulate power transmission every step of the way from generator to home, store and factory.

An engineer glances at the dials, which give him a running picture of the system and the changing demands he has to meet—information which has been brought to him by Bell System telemetering channels.

From his position, he switches loads, starts and stops generators and localizes failures—even at distant points—over a network of remote control channels provided and maintained by the Bell System.

If you would like to know more about how Bell System communications can help you, an engineer will be glad to survey your company's needs. There's no obligation. Why not call your Bell Telephone representative today?

BELL TELEPHONE SYSTEM

Private Line Telephone, Private Line Teletypewriter
Channels for: Data Transmission, Telemetering, Remote Control, Telephotograph, Closed Circuit TV

A MESSAGE TO AMERICAN INDUSTRY • FIFTH OF A SPECIAL SERIES

THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

What Can Be Done About It?

There is no easy or quick way to overcome the shortage of scientists and engineers that has become a threat to our national security and economic progress. The solution can come only through diligent efforts extending over several years to bring the supply of technically trained people into balance with our needs. Meanwhile, the pressure of the shortage can be relieved if industry, government and education make better use of the limited number of scientists and engineers now available.

Earlier editorials in this series have discussed the dimensions of the shortage of technical manpower, its meaning for our national security and our economic well-being and the causes of the shortage. This final editorial will survey some of the measures that can be taken to overcome the shortage. Most of the proposals presented here have been suggested elsewhere. But in combination they appear to offer the best hope of an answer to this serious national problem.

Soviet Methods Not For U. S.

It is clear that no crash program, inspired by panic and designed indiscriminately to drive hordes of high school students into science and engineering, is suitable for the United States. Even if we adopted Soviet methods of channeling a large portion of our brightest young people into technical fields, it would be at least four years before results appeared in the volume of college graduates. And such an approach would do no credit to the American way of life.

Any crash program, whether it involved totalitarian methods or simply overselling the advantages of technical careers, would be objectionable for other reasons as well. It would jeopardize the quality of scientific and engineering training. It would put many young people in fields where they have little aptitude and deny them to other fields for which they are better equipped. And, if carried too far, it might even result in the overcrowding that was feared prematurely a few years ago.

The most important problems for the long run, as the preceding editorial in this series indicated, are in the area of education. Any real solution must reduce the loss of talented high school graduates who do not continue their education for financial reasons or because of lack of interest. Also, it must improve the quality of high school preparation in science and mathematics and, above all, relieve the critical shortage of teachers.

Basic Needs in Education

Substantial increases in salaries of teachers in most of the nation's school systems are essential if high school students are to receive adequate preparation for courses in science and engineering. Pay scales that have lagged behind rising living costs and salaries available in industry have placed great strain on even the most devoted teachers. There has been a sharp drop in the number of new graduates trained to teach science and mathematics, and of this smaller number many have decided not to follow careers in teaching.

Raising teachers' salaries to more realistic levels must be primarily the job of local school districts, aided by state governments. If, in face of rapid increases in school enrollments, local and state resources prove insufficient, then federal aid will have to be considered. Higher teachers' salaries, however financed, inevitably mean higher taxes. But without appreciable improvement soon, the quality of our entire educational system is in danger.

At the college level also, financial aid is needed to provide scholarships for promising students and to increase faculty salaries. (An earlier series of editorials dealt more fully with these problems, and business aid to higher educational institutions has been mounting at a gratifying rate.)

But not all the educational problems related to the shortage of scientists and engineers can be solved with money. Science and mathematics have steadily been de-emphasized as more youngsters have gone to high school for terminal education rather

How business is helping to relieve the shortage of technical manpower

Summary of a Survey by McGraw-Hill Correspondents

Sponsoring summer study programs for high school teachers
Arranging cooperative work-and-study programs for students
Sponsoring college fellowships and scholarships in science and engineering
Paying tuition of employees taking science and engineering courses
Keeping college faculties abreast of new developments in industry
Hiring high school science teachers for summer and part-time work
Giving old, but usable, laboratory equipment to schools
Cooperating in high school science exhibits
Sponsoring regional science fairs
Sending speakers and training aids to schools
Opening plants for student tours
Analyzing jobs to relieve engineers and scientists of routine work

The McGraw-Hill Department of Economics will be glad to hear of any other ways business is helping relieve the shortage.

than for college preparation. This de-emphasis must be reversed.

Techniques of instruction, furthermore, can stand improvement at all levels of education. Professor E. P. Northrup of the University of Chicago observes: "In the past fifty years . . . there has been a revolutionary change in the character of mathematics, yet not a trace of this change is to be found in the curricula of all but a handful of secondary schools throughout the country." Colleges and universities may have to examine old fetishes about light teaching loads and small classes in order to make more efficient use of their faculties.

What Industry Can Do

Industry has the immediate problem of better utilization of available technical manpower and the long-range responsibility of helping increase our resources of trained people. Frantic recruiting practices and reckless bidding up of starting salaries—financed largely by government money for defense orders — are not the answer. There is need for earnest consideration of incentives for experienced scientists and engineers, who too often must look to sales or executive positions for adequate financial recognition.

Industry in many instances could make more efficient use of engineers and scientists by shifting work to technicians, clerical personnel and even machines. One company found that 15% of the time of an engineering design group was spent on routine jobs and that this valuable time could be saved by adding a technician and a clerical worker to the group.

Other potential sources of technical manpower could be tapped more extensively to relieve the shortage. Very few women have entered what has been traditionally a man's world. Negroes are only slowly gaining educational and employment opportunities in technical fields. And many experienced older men can still give useful service.

A Good Beginning

Much is being accomplished already in efforts to attract more young people into scientific and engineering careers. A summary of some of the things business is doing is presented above. Other notable contributions are being made by such organizations as the professional engineering and scientific societies (especially through their manpower commissions), the National Science Foundation, the National Research Council, the National Education Association, the National Merit Scholarship Foundation and the Thomas Alva Edison Foundation.

Results are beginning to appear in rising enrollments in engineering schools and technical institutes. Between 1951 and last year, according to McGraw-Hill's annual survey of technical institutes, enrollments in these schools rose from 46,000 to a record 67,000. Engineering enrollments rose in the same period from 166,000 to 243,000. A rising tide of graduates is already being made available to American industry.

This is a good beginning. But only with wider appreciation of the serious implications of the shortage of scientists and engineers and intensified efforts on the part of business, government and education to relieve the shortage can we hope to overcome this threat to our national security and economic well-being.

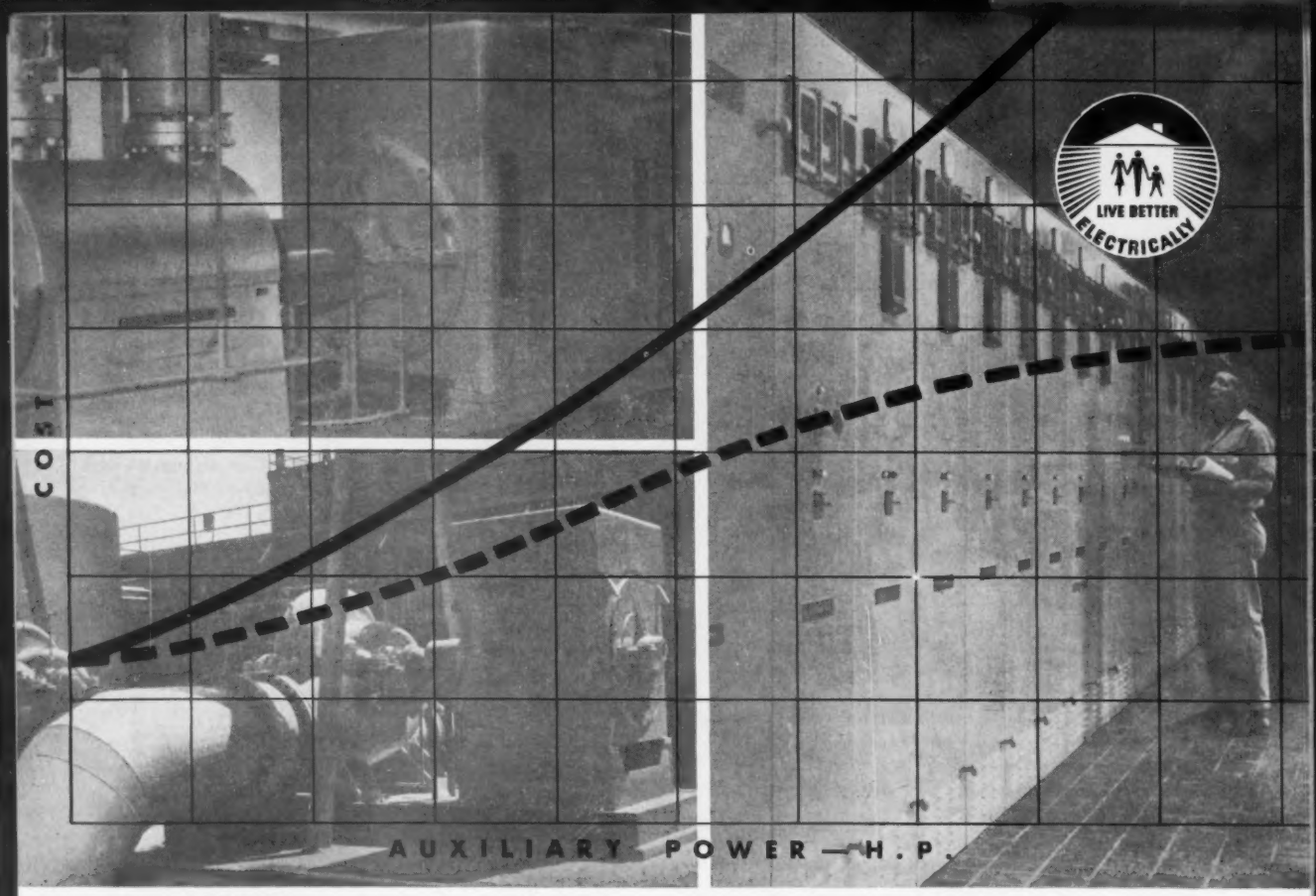
This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw

PRESIDENT

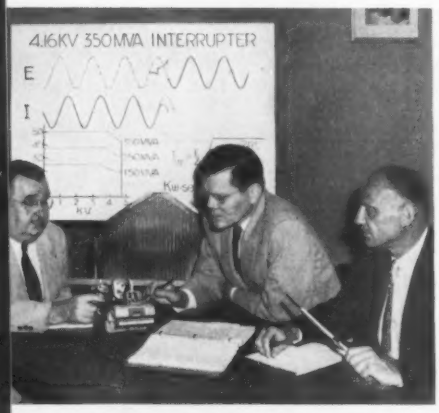
McGRAW-HILL PUBLISHING COMPANY, INC.



AUXILIARY POWER COSTS can be reduced by re-evaluating present system design with an eye to future expansion needs. Solid line indicates extension of a present method of system design. G-E study shows substantial savings possible by proposed method (dotted line).

How can power station costs be cut?

New General Electric study points to savings through careful engineering of auxiliary power systems



4.16-KV, 350-MVA SWITCHGEAR will serve large auxiliary power systems of the future. Above, engineering mgrs. G. M. Reed, E. M. Troischt, and J. G. Torbit, G.E.'s Medium Voltage Switchgear Dept., study design of interrupter components for new high-capacity, metal-clad, magne-blast equipment.

Units over 500,000-kw, operating at super-critical steam conditions are probable within the next several years. The trend towards increased unit size and higher pressures means auxiliary power requirements will increase rapidly.

A recent General Electric study based on an all-electric auxiliary system indicates that major savings can be made by thorough planning of the plant's auxiliary power system. For instance, for units as large as 200,000 kw and up, auxiliary system voltage is shown to be most economical at 4.16 kv rather than at higher voltages—even if it requires the use of as many as four buses. Another possibility for economic gain is offered by using split low-voltage winding transformers.

An additional cut in costs can be achieved by using selective motor throwover and paralleled throwover schemes for emergency and routine bus transfers, rather than transferring 100% motor load as is sometimes the practice. This proposed method of operation increases the size of units to which a particular rating of switchgear can be applied.

To obtain details on how intensive planning of the auxiliary power system pays off, contact your General Electric Apparatus Sales Office. For a copy of the study on auxiliary power systems, write for GET-2673, General Electric Company, Section 301-290, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. VOL. 117, NO. 5 NOVEMBER 1956

At the San Francisco Electric Club the electrical industry was asked for its help to . . .

Fill the Vacuum

Oliver F. Burnett

President, National Electrical Contractors Assn.

I am going to talk about contractors to you today because we have some problems and we need your help. I want you to understand them. As you know, our convention theme is *The need—who will fill it?*

As I traveled around the country this year to our district meetings, it appeared to me that America today is underbuilt. It seems strange. Few people realize that today America is underbuilt.

We have need for somewhere in the neighborhood of a million and a half homes a year. We are going to need fifteen million homes in the next ten years. What are we building? Slightly over a million. We are not even keeping up with the need despite all this activity we see in residential building. Those are actual facts.

Of course, when new homes are built, new communities are established. There is great need for commercial establishments of all kinds, stores where the people can buy goods. Naturally, if we are not building enough homes, we are not building enough commercial establishments.

The same thing goes for public works. The same thing can be said about the schools. You know what the school situation is. We are barely keeping up with the needs today.

On our industrial front, we thought we knew what we were doing with respect to industrial expansion. The National Association of Commerce made great surveys in Chicago a few years ago trying to find out what the industrial companies of this country were going to do in the way of building. They found out for certain in 1953 that there was going to be ten per cent less new production of industrial plants.

What happened? Industrial expansion that year was some 17% higher than it had been the year before. In many of these industrial companies, management began to find out that instead of reaching the peak of expansion they had reached a new plateau; that there were distant peaks still to climb.

So our industrial expansion has been growing and growing in this dynamic economy of ours. Where it will end, we don't know. Utilities we do know about. In the next nine years plans are on the drawing boards to double the generating capacity in this country; generating capacity that has taken from the time that electricity was discovered until the present day to develop. In ten years we are going to double it.

So America is still underbuilt.

You add to that the modernization program, the activities of manufacturers in the sale of appliances of all kinds—you all know the story. Gentlemen, America is underbuilt and that is where the need arises.

Who Will Fill It?

All this adds up, in the electrical contracting industry, to about $5 billion worth of services that are required in each of the next ten years. The highest we have ever had is a little over $4 billion. Naturally, we are concerned.

Who is going to fill this need? That is what we electrical contractors are talking about at our convention.

I think in our discussions we are going to discover that it will take a lot of level-headed planning on our part to fill this need. Some of our old ideas, some of our old-fashioned attitudes—and I don't mind telling you among the contractors there are a great many old-fashioned attitudes—some of those attitudes are going to need to be changed, yes, even more, some of the even more modern plans that we have had are going to have to be changed to meet this need. In this dynamic economy in which we find ourselves today, I feel it is going to require some dynamic attitudes and planning.

I say again that is what we are here for.

Naturally, with such needs vacuums are created. As you all know, whenever a vaccum is created, if there is a leak anywhere something will rush in. I feel and sincerely hope, I strongly believe, that the electrical contractor will fill this need. He is the first in line; he is the logical person to fill the need. But if he doesn't, someone else will.

Where do all your other folks come in, you in the electrical industry? Here is where we need your help. This is a big job; a big job that has to be done. It is probably one of the biggest jobs our industry has ever faced. And what do you do if you have a big job to be done? Suppose you were going to build a big industrial plant. Who do you look

for to build it for you? You look to the man with the most know-how and the most experience.

The electrical contractor has been in this business for years filling the need of electrical construction work in the American economy. It is my belief, and I don't think anyone would disagree with me, that he is the most qualified man to fill this great need.

I would like everyone in our industry to believe this. Because I have heard preached from all branches that we are all somewhat interdependent. And if we are going to get a job done, it is going to require the help and cooperation of every particular branch. I think it behooves all branches of the industry, if the elcetrical contractor is the most qualified and has the know-how to do this tremendous job, to get behind him and help him do it.

Problems Needing Help

Now, we have a few problems of our own. I would like to speak to you about them a little bit. As I went about the country this year, in the seven districts, coast to coast, I found two major problems confronting the electrical contractor. One of them is the manpower problem.

We have the most acute shortage of manpower that we have ever known. We have never yet failed to meet our obligations with respect to the electrical wiring contracts in this country, and I don't expect we are going to fail now. But we do have the most acute shortage of manpower that the country has ever known.

You might also be interested to know that we cooperate very closely with the International Brotherhood of Electrical Workers. Through ourselves and the International Brotherhood we do approximately 70% of all electrical construction work in the country.

I also believe that every man has a right to operate as he sees fit and we embrace men that do not subscribe to the principles of the IBEW. That is their privilege and their right.

I believe also that any man in this country has the right to determine whether he belongs to a union or whether he does not. But the fact remains that our industry has been built by the fine cooperation between our association and the IBEW. We must recognize that fact. They have done a fine job to date.

It is through them that we were able to solve these manpower problems, to bring the skills into our industry that are needed, through our joint training programs of apprenticeship.

We have also made some social progress in that we have helped them develop their pension plan. We also have an organization in our industry that makes us practically strike free. Out of five hundred and some odd local unions, we have agreements with approximately 300 of them through our local chapters; and in most of those agreements they have a clause that provides for settlement of all disputes that come before the Council on Industrial Relations. The findings of that council are binding and final. As a result, there are no strikes in our industry. We do have jurisdictional problems but even there we have provisions that the work must go on. I admit that at times they are not always lived up to, but we are making progress to see that they are.

Such fine arrangements in labor relations in our industry did not just come about by wishing for them. It required hard work on the part of a lot of men in the past. Today we have one of the finest relationships at the national level with the International Brotherhood of Electrical Workers that I have ever known in my short existence. We have their full cooperation and understanding in all of these problems.

Work Out Together

Our trouble comes at the local level. As you know, local unions have local autonomy. We have local joint labor committees in which we sit down and negotiate agreements. Unfortunately, most of our people do not sit down in such local committees until there is an argument or an agreement to change.

Your national association is sponsoring the holding of local labor-management committee meetings at least once a month to talk about the problems of the industry. When we don't have an agreement to talk about we can talk about the planning needed in the industry.

I think if we can follow through and implement that kind of program we can solve the manpower problem of bringing into our industry the right quantity of men and also the right quality of men. We have not lost sight of the productivity need.

Destructive Bidding

The second problem I encountered is one that is common to regions. I call it the "low-cost bidding problem."

It is a paradox that at the time of our greatest prosperity in this county contractors are complaining about bids going at cost or below. I suspect that the suppliers are complaining about the treatment they are getting from the contractors with respect to competitive buying methods. That problem has plagued mankind, I believe, for many, many years.

If we go back through history and find out the reasons for it, maybe we can find the solution. I was reading recently a book concerning the development of America's great industries, the railroads—the story of the Vanderbilts, the Drews, the Fiskes, the Harrimans, and so forth.

That story was one of industrial war, aimed at one thing, monopolistic control through the elimination of competition; the story of the Standard Oil Co., John D. Rockefeller, whose philosophy was that simply waste and inefficiency brought about chaos in an industry and, if you wanted to eliminate waste and disorder and inefficiency, the only way to do it was to eliminate competition.

Someone has said that competition is the life of trade. But then it should be added, "Cutthroat competition is the death of trade."

Rockefeller went on to form the first trust in this country and, as you know, that was the start of the anti-trust laws.

You can go on through history and see all the schemes and plots and plans of all kinds which today in every case are illegal.

Public is Wise

It seems to me that the answer to this problem does not lie in this direction, the aim of monopoly or the elimination of competition. If we adopt this philosophy, I may think maybe I am a pretty good schemer, a pretty good conniver, but there is always someone better than I am at it, and I don't want to cope with that.

More than that, I believe it is a dead-end street in this day and age. It will take something more. I think we should look in some new directions to the solving of these problems.

Today we have a public that is quite enlightened because of fast communications and transportation. As we enter the atomic age, we are finding that our public is quite enlightened today as to the role expected of all of us businessmen.

Management, too, largely because of social developments, is quite enlightened. We do not find the bigotry that we used to find in management today. They are more enlightened and educated and are returning to business management methods.

I believe also that the advertising vocation is beginning to take the place of the financial vocation with respect to the tempo of our country.

When the utilities wanted to develop the Housepower program, they didn't go to Wall Street to find the financiers down there to make some stock market manipulations to help

them solve the problem. They went to the advertising profession to enlighten the public.

I think today all managements are beginning to see that an enlightened public is a great boon to the American economy.

Manage to Make a Profit

Good management, of course, has something to do with it. Many of us think that our contractors do not have what we call good management. I think that term perhaps may be a little maligned. Actually, when you get down to it, when you are talking about management, you are talking about three things. You are talking about sales management of the company to provide the ability in the company to make sales at a profit, naturally. And when one gets the sales, he must be a good enough manager to provide an organization to perform and produce the goods to satisfy those sales.

He must have enough money, of course, to finance himself to produce those sales.

Now, suppose we find a contractor that is a fine salesman but he can't produce the goods. He can't stay in business.

By the same token, if he is a fine producer of goods, a fine contractor in every respect but can't sell his services, he will find he is eating up all his finances by paying his help to stay in business. Soon he will not have the finances.

Good management, in providing those three basic elements, must keep them in balance. That is the simple formula of management. The details of it get complicated, I admit.

Let's not try to be on every contract there is. Let's sell enough of the kind that we can produce from our shop at a good profit.

Let's talk about the profit angle a little bit. Did anyone ever stop to consider that no one likes to do business with a man who can't make a profit? Does anyone here like to do business with a firm that is not making a profit? Does an employee like to work with a company that isn't making a profit? Would any of your employees like to work for you if you weren't making a profit? Would your supplier like to do business with you if you didn't make a profit? Perhaps. Does the bank want to loan you money if you can't make a profit? Someone said, "No, they don't. They leave that up to the suppliers." No one likes to do business with a loser. So why be a loser?

All right! From the standpoint of logic and reasoning there is no reason on earth why we should have a low-cost bid problem. But why do we have one? Because any businessman takes a job below cost just because he wants to do that job. It is not a problem based on reason and logic. It is a problem based on man's emotions. His heart is telling him what to do. He doesn't want that so-and-so to get that job at any price, and he sacrifices all the hard effort and the hard work of his employees by taking the job below cost.

I think we need to look in some new directions. I think we have to change the feelings inside us. If every contractor tomorrow in this country would say, "From here on I am never going to put a bid in on a job that does not contain a net profit," the low-cost bidding problem then would be over.

It has to do with the hearts of people.

Those are a few meagre thoughts that I would like to have you consider. I don't know that we can find the answer to all of them, but we are going to try.

I earnestly solicit the support of all branches of the electrical industry to realize that the electrical contractor is attempting to fill the need and fill these vacuums that are being created by this dynamic economy of ours. Let me repeat, if the electrical contractor is the most qualified and has the know-how to do the tremendous job, get behind him and help him do it—for your own best interest as well as his.

Oregon Chapter develops a national

Line Apprentice Course

A notable contribution to the industry's betterment is being made by the Oregon-Columbia Chapter and the Northwest Line Constructors Chapter of National Electrical Contractors Assn. Laurence C. Rodgers is manager of both and to him can be credited the initiative for the course of related study for outside electrical construction apprentices.

Developed by the Portland group, it has been a joint work of the NECA chapters, the International Brotherhood of Electrical Workers and the vocational education department of the State of Oregon. But it will be used nationally as the study course for apprentice linemen wherever the National Joint Apprenticeship and Training Committee for the Electrical Industry operates such courses. This was announced at the NECA convention in San Francisco by William Damon, director of the apprenticeship program, Washington, D. C.

Preparation of the course is nearing completion. It is promised by the first of 1957. Most of the units have already been written and are being printed. There are nine units to the course. It is running to twice the originally contemplated length in order to cover all phases of line construction. Since more and more outside construction and maintenance is being contracted to electrical contractors by utility companies, the training of men to handle all kinds of construction becomes increasingly important both to contractors and to utilities. The power companies in the Portland area have cooperated completely, Rodgers says, both in preparing the courses and in giving contractor apprentices opportunities to do hot line work as part of their on-the-job training.

The units of the course cover the following subjects. Text will be the *Lineman's Handbook*, a McGraw-Hill book, in its latest edition. In fact, page proofs of the revised text were furnished by McGraw-Hill to aid the vocational department in preparing the course.

Unit 1. The history of the trade and industry relations.

Unit 2. Accident prevention and first aid, transportation rules and hazards.

Unit 3. Elementary electricity, basic theory, circuits, characteristics and sources.

Unit 4. Blueprint fundamentals and interpretation.

Unit 5. Rigging, all forms used in line work.

Unit 6. General line construction and maintenance. Twenty subjects under this classification.

Unit 7. Transformer construction and operation.

Unit 8. Transmission and distribution systems.

Unit 9. Substations and outside switching.

Each unit is subdivided to thoroughly cover the field. Continued study by this earnest group in Oregon promises to keep the course abreast of new trends, methods, developments in outside construction. It is the first course contractors have ever developed.

Fig. 1—Southern California Edison station with nuclear reactor (rear), turbine-generator (left), U-shaped steam-generator (center)

North American Aviation Inc. and Southern California Edison team up to give the West the

First Atomic Power Station

A. C. Werden Jr.

Engineer for Atomic Energy
Southern California Edison Co.
Los Angeles

Perched in a saddle of the Santa Susana Mountains and surrounded by potato-shaped rocks, a Southern California Edison Co. turbine-generator will soon turn nuclear-heated steam into kilowatts. The power generation facilities, completely financed by the Edison company and costing approximately $1,200,000, operates in conjunction with a reactor designed and built by Atomics International, a division of North American Aviation, the reactor is part of the AEC's peace-time nuclear power development program. The sodium reactor experiment (SRE) was of particular interest to the Edison company since it afforded temperature and pressure conditions at the turbine throttle similar to those encountered in fossil fuel plants. When the plant is in full operation in early '57, it will be the first nuclear heat plant in the United States to generate commercial electric energy from a

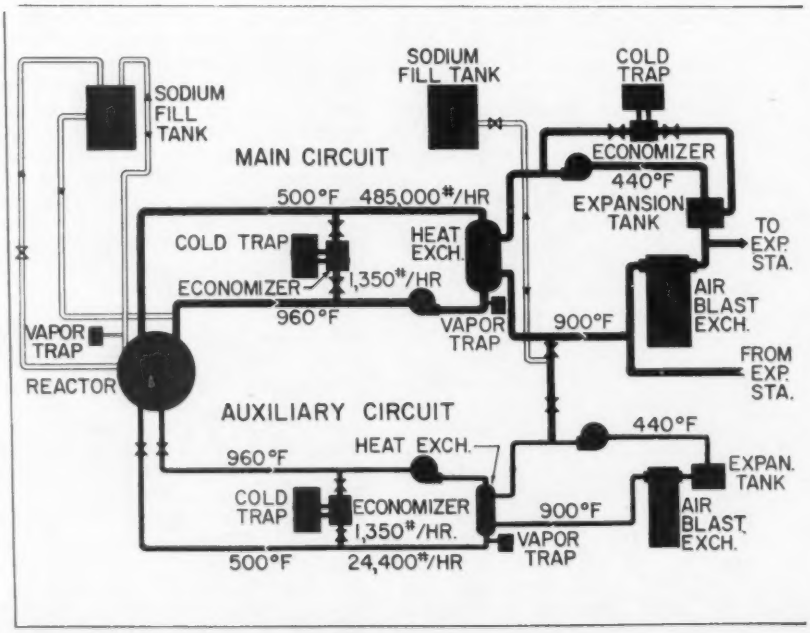


Fig. 3—SRE cooling system diagram shows sodium heat exchanger, outlet to steam plant

nonmilitary reactor, and will bring the first nuclear electric power to the West Coast.

In operating the 7,500-kw steam plant, the Edison company will pay 45c per million Btu for the heat energy used to generate electricity. While the addition of 7,500 kw is not an important addition to the Edison system, the plant facilities were designed to operate with a reliability comparable to that of a major steam station. The station is as similar to a conventional steam plant as the special requirements of a reactor-heated system will allow.

The major departure from a fossil fuel-fired station is shown in Fig. 3 schematic diagram of the SRE sodium cooling system. The radioactive sodium in the main primary system transfers its heat to the nonradioactive sodium in the main secondary system by means of the intermediate heat exchanger. The nonradioactive sodium then is circulated to the shell side of the Edison company's liquid metal-to-water steam generator.

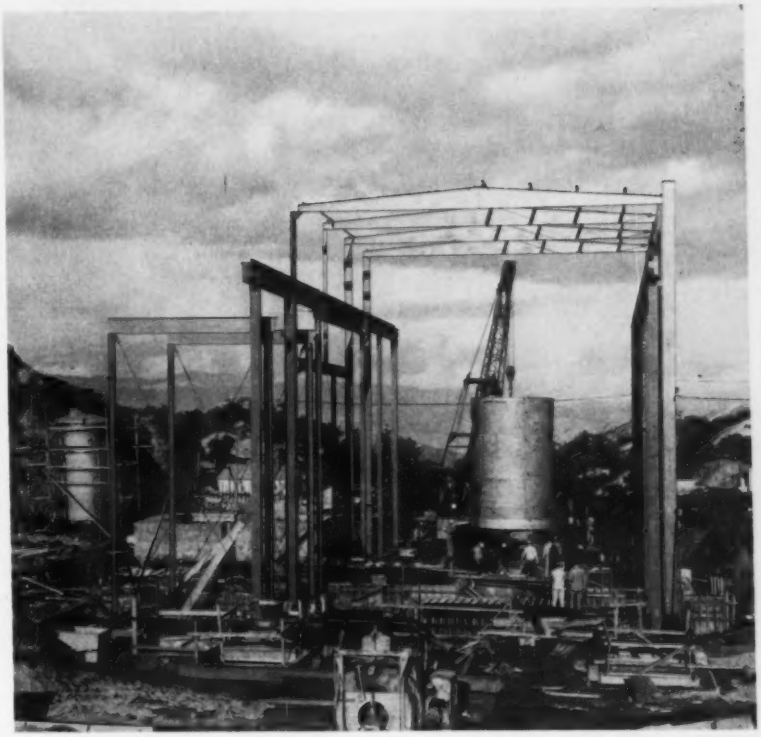


Fig. 2—Lowering outer reactor tank during construction of sodium reactor experiment

The Important Link

Great engineering interest is directed toward the steam generator that links the familiar steam cycle with the cooling cycle of the reactor. Furnished by Babcock & Wilcox, the generator is of the "once-through" type, probably the first to be placed in commercial operation in the United States. Not only will this piece of equipment perform the duties of the conventional economizer, evaporator and superheater, but in addition it is designed to perform under varying heat input temperatures. This is done by means of an attemperator, designed to maintain a constant throttle temperature of 825 F by introducing feedwater into the steam through a venturi section. With sodium entering the steam generator at 900 F and leaving at 440 F, 88,700 lb of steam per hour will be produced at a pressure of 620 psi and 825 F. Under these conditions, the attemperator will not operate.

As the sodium temperature increases, the steam flow to the throttle will remain the same but about 11,000 lb per hour will be introduced as feedwater through the attemperator.

The steam generator is an all stainless steel heat exchanger, formed in the shape of a U. It is nearly 80 ft long. The tubes are double-wall construction with sodium on the shell side and water flashing to steam in the inner tubes. The annular volume between the tubes is filled with mercury pressurized at 190 psi. The pressurized mercury serves as a monitoring fluid for detecting tube failure. In the event of a tube failure indication, it is possible to positively identify the faulty tube prior to removing the exchanger heads. This is done by introducing helium gas under pressure to one side of the tube wall and "sniffing" for the faulty tube, with a mass spectrometer leak detector.

During assembly every effort was made to prevent leaks in this equip-

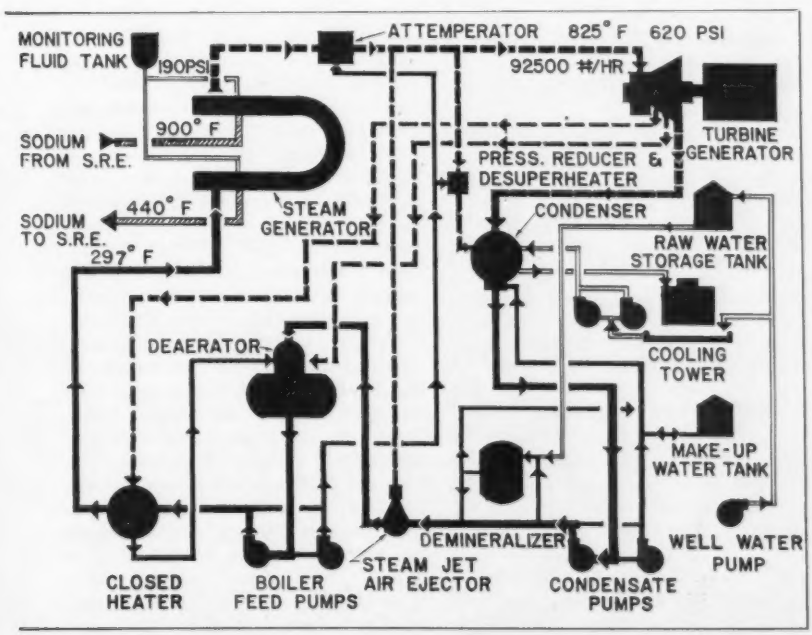
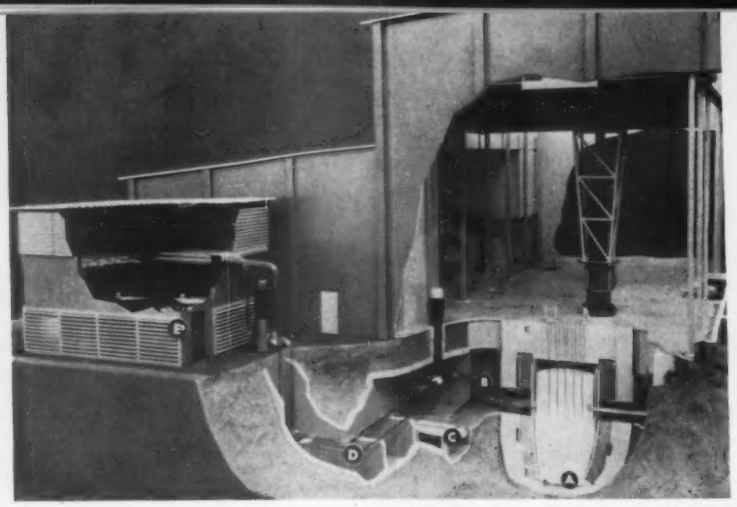


Fig. 4—Familiar steam flow diagram shows attemperator and location of special auxiliaries



About the Reactor

The heat source for the Edison company's experimental station is an AEC reactor, designed and constructed by Atomics International. The purpose of this joint venture is the exploration and improvement of the technology associated with the sodium-graphite type of reactor. The Edison company recognized that the installation could not be an economical power source and still give full value as a research and development experiment. Salable electric power at this time is a by-product in the search for low-cost nuclear heat source.

The model pictured above shows at (A) a cut-away view of the reactor showing its location below grade. The entire reactor is contained in a biological shield, constructed of high-density concrete. Inside of the shield are five separate liners, the inner being a 1½-in. stainless steel core tank.

The fuel elements are suspended from small plugs in the top rotating shield and extend down through axial coolant channels in the graphite moderator assemblies. A total of 43 tubes are provided for fuel elements and experimental purposes, with 37 fuel elements capable of producing full power.

The fuel elements consist of 6-in. uranium slugs enclosed in stainless steel tubes. They are fabricated from slightly enriched uranium containing 2.8 atom per cent U-235. The graphite moderator and reflector is supported on a stainless steel grid plate near the bottom of the core tank. The graphite is in the form of hexagonal prisms placed on a triangular lattice, 11 in. between centers. Each prism is 10 ft in height and is clad in zirconium. Voids within the high neutron flux density areas of the reactor are filled with helium gas.

Four control and four safety rods extend up through the rotatable shield. These are boron-nickel composition, contained in stainless steel thimbles and are positioned in channels between moderator prisms.

The control rods are driven at speeds of .3 to 3 ft per minute. The safety rods fall by gravity, either under fail-safe or scram-actuated conditions.

The primary reactor cooling system (B) shows the radioactive sodium circulating through the intermediate heat exchanger (C). Here the heat is transferred to nonradioactive sodium in the main secondary loop, which contains the steam generator.

Sodium in the main secondary loop (D) can be circulated through the air blast heat exchanger when the Edison company's steam generator is not in operation.

An auxiliary cooling system, rated 1 mw, removes afterglow heat during shutdown. Variable speed pumps used in both systems contain shaft sodium freeze seals. A cooling gland around the pump shaft solidifies the sodium so that the pump, in operation, is constantly shearing the sodium seal.

Traps in the sodium circuit are for the purpose of removing oxygen. As further safeguard, galleries in which sodium handling auxiliaries are located contain a nitrogen atmosphere.

Fuel washing and storage cells are provided below floor level beyond the reactor. Also illustrated is the fuel handling equipment with shielded operator's platform. The reactor control room and engineering offices are in the bay to the left of the reactor room.

ment. To protect the tubes against stress corrosion failure during operation, water purity has been specified: water PH value between 9.5 and 9.6; iron content not to exceed .01 ppm; total solids shall not exceed 0.5 ppm; free oxygen shall not exceed .005 ppm.

The water is purified by a twin mixed-bed demineralizer and deaerator.

Thermal shock in the steam generator is minimized by limiting the temperature change at the rate of 30 F per hour.

During start-up operation, the steam generator will be preheated to 350 F by means of an auxiliary electric water heater. Sodium at 350 F will next be admitted and gradually raised to 440 F. As the inlet sodium is gradually increased up to 900 F, feedwater will be circulated so as to hold the sodium outlet temperature at 440 F. Fig. 4 shows a conventional steam cycle with water purification and start-up auxiliaries. The turbine is a 3,600 rpm General Electric unit with a guaranteed heat rate of 11,544 Btu per kilowatt-hour at full load. Both stages of extraction heat feedwater but the primary purpose of the second stage is to release the oxygen content in the condensate with a Cochrane tray-type deaerating heater.

The condenser is a 7,000-sq-ft, two-pass, surface-type unit manufactured by Ingersoll-Rand. The condenser is supplied with 75° water by twin circulating pumps from an induced-draft cooling tower.

The Control Scheme

Due to the fact that the primary purpose of the SRE is to develop basic reactor technology, the controls are connected initially to cause the steam plant to follow the reactor output, similar to a stream-flow hydro plant. Accordingly, the steam plant control system is designed to remove heat automatically from the secondary sodium loop so as to maintain constant sodium temperature return to the intermediate heat exchanger. This is accomplished by controlling the position of the feedwater valve by means of quick response, resistance-type temperature device in the sodium outlet line of the steam generator. In order to partially compensate for the time constant of the steam generator and the time lag in the temperature control relays, an inlet sodium flow signal has been included as an anticipatory device. The feedwater control valve is equipped with an air lock to maintain its position in the event of control air failure.

The output of the turbine-generator, during normal operation, will be controlled by a pressure device in the main steam header. This device will open or close the steam turbine control valves as required to maintain constant pressure.

Because the SRE and Edison control rooms are physically separated, there will be interconnecting telephone and instrumentation circuits. SRE information displayed on the Edison control board includes:

1. Neutron flux level expressed as per cent of power
2. Reactor scram alarm
3. Reactor set back alarm
4. Sodium inlet and out temperature.

Steam plant information displayed in the SRE control room:

1. Kilowatt output
2. Steam pressure
3. Feedwater flow
4. Alarms on low feedwater, sodium outlet temperature, throttle trip and monitoring fluid pressure.

Most important of all these interconnected alarms is the signal initiated by the loss of feedwater pressure to the steam generator. This signal is included in the SRE scram loop and will, upon loss of feedwater pressure, initiate a reactor scram operation. Such an occurence, however, is considered to be unlikely because of the reliability furnished by the dual automatic pumps on the feedwater, condensate and condenser cooler lines.

Power from the generator connects through an air circuit breaker to a three-phase power transformer and station service bus. The step-up transformer raises the voltage to 69 kv for transmission into the Edison system. Connected to the station service bus and supplied from either the generator or the system is the station auxiliary transformer bank, which serves the auxiliary equipment at 480/240/120 v.

The greatest significance is probably in the fact that they are DOING the job. This is not a report to the Senate; it is peace-time atomic energy in action. This is not a public or private power project; it is government and business working together to get answers. It is not a debate over reactor cycles or conjecture as to whether atomic power will ever replace the conventional fuels. It is a program of DO. The engineers that make their living in the saddle of the Santa Susana Mountains will some day soon know the truth about atomic power generation and will have some kilowatt-hours to show for it.

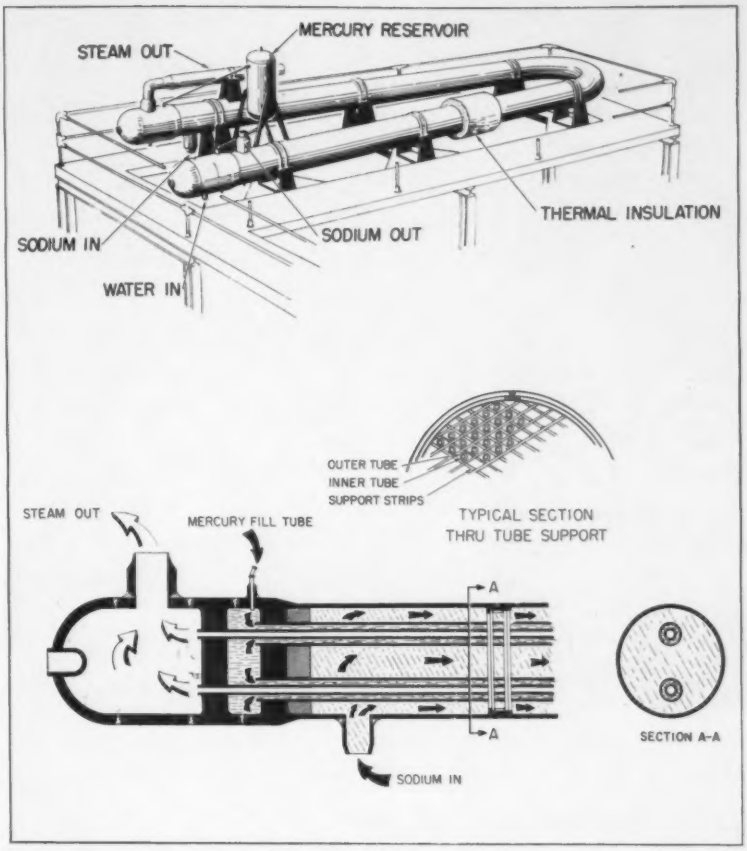
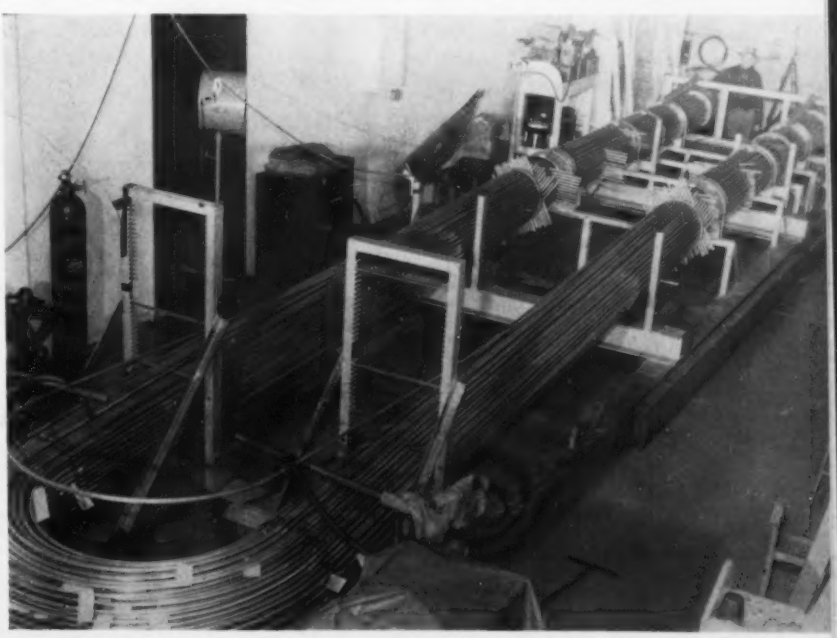
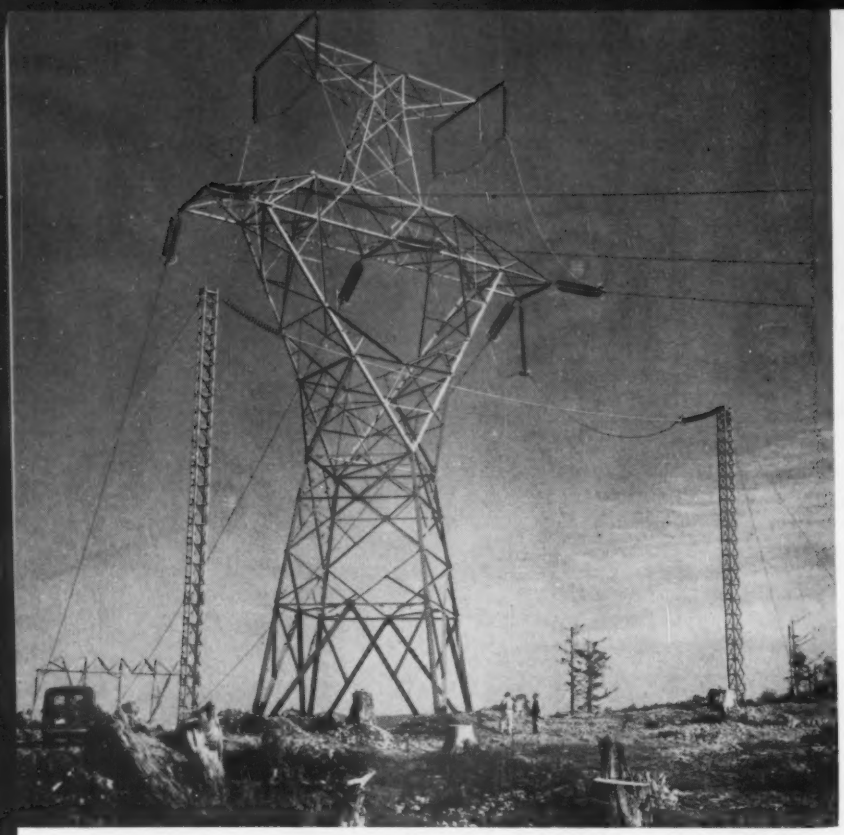


Fig. 5—Once-through heat exchanger does job of economizer, evaporator and superheater

Fig. 6—Construction view of steam-generator tube bundle before assembly and final tests





Lattice poles used to transpose outer conductors rather than specially designed tower

Completion of tests places . . .

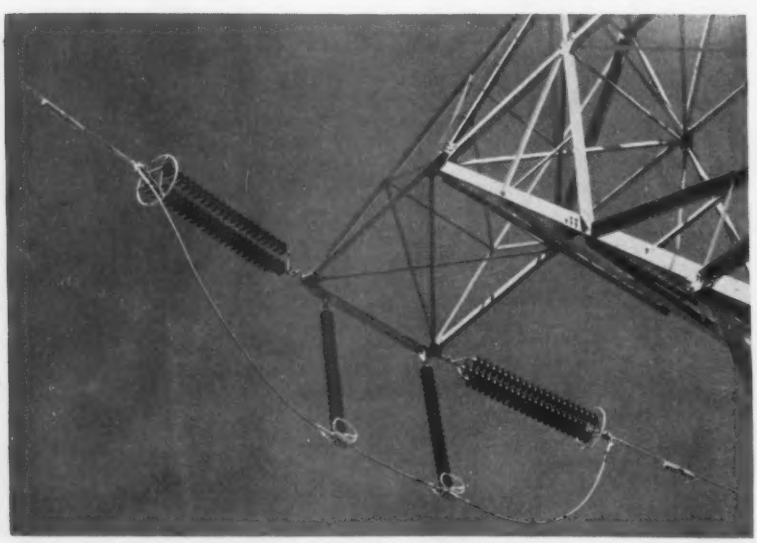
345-kv Line in Service

Getting the power to market in the West has always meant high transmission voltages. Bonneville Power Administration's 175-mile McNary-Ross 345-kv line has withstood tests satisfactorily and is now in routine operation. The line was completed last October and has been operating at 230 kv awaiting the arrival of the 230/345-kv autotransformers.

Radio Noise a Problem

With tests completed, it is assumed that the problems of radio noise and corona, which held up stringing of the line for some weeks, were solved. Stringing the 1.6-in. ACSR conductor presented many new challenges because of the size of the cable and the care required to prevent abrasions that might cause sharp edges lowering the corona starting voltage. Using tension-stringing rigs (see EWEST, September 1954, p 98), an attempt was made to keep the conductors off of the ground. When in contact with the ground, planks were put down and in some cases emery cloth was used to smooth the conductor.

After stringing some 30 miles of line, operations were halted and the stringing techniques were revised before work was continued. A unique field polishing method was developed after tests at Oregon State College indicated that abrasions could lower the corona starting level 20% or more. The result of the care used in stringing and the new techniques involved represent an important step forward in the use of extra-high voltages.



Grading ring equalizes electrostatic stresses on insulator, reducing radio interference

Emergency Operation at 230 Kv

The circuit that enabled BPA to use the line at 230 kv offers reliability as well as economy. In the event of a failure of the step-up or step-down bank, the lines can be used at 230 kv on an emergency basis. Because of this arrangement, BPA felt it could do without a spare transformer at either location. An additional advantage of the circuit is that power switching is done on the 230-kv side of the transformers, thereby utilizing lower cost breakers.

600-mva Auto Bank

The power transformers, manufactured by Allis-Chalmers, make one of the largest banks in the country. Each of the six units stands 36 ft tall and weighs 394,000 lb. Electrically, the units are rated 230/345 kv with 825- and 1,175-kv basic impulse levels. Low frequency tests of 360 and 520 kv are specified. The reduced insulation level was selected over 900 and 1,300 BIL

to save nearly $360,000. Arresters rated 182 and 265 kv are used in conjunction with the transformers.

Each unit has a triple rating, 120/160/200 mva. At full capacity the units could transform the entire output of Bonneville Dam. McNary now has 13 units—more than 1,000,000 kw. At present, they will haul the complete output of McNary's four generators, or about 320,000 kw. This is sufficient power on a single circuit to meet the present-day need of Portland.

Why 345 Kv?

Economic studies indicated that 345 kv would be the best voltage for this loading and distance as compared with 287 and 400 kv. The single line, with the addition of series capacitors, can be increased to 500 mva or higher.

The fact that carrying capacity increases as the square of the voltage keeps the pressure on users to go to extra-high voltages. It isn't a simple change. As impulse levels go up, the prices of equipment soar. And well they might, for technical problems pyramid at the higher levels. The kid-glove handling of 345-kv conductor is but a single example of the added complexity. Tipping the scale against the increased equipment expenditures is the saving in right-of-way costs, transmission towers, conductors and installation. In the case of the McNary-Ross line, the load hauling capability of the 345-kv line is nearly twice that of the conventional 230-kv line.

More—Maybe Even Higher

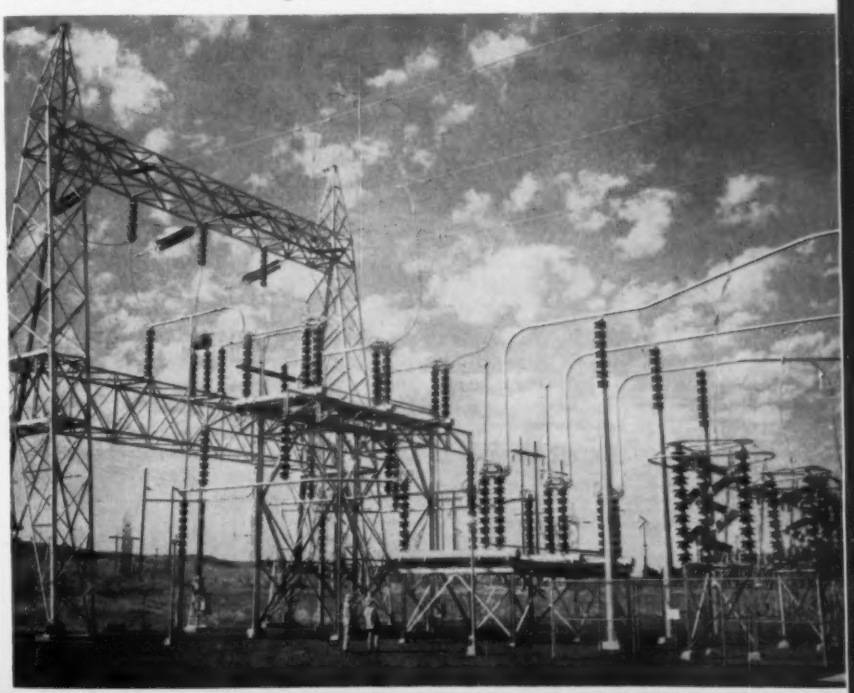
BPA is currently building a 345-kv line from Chief Joseph Dam to the Puget Sound area. Ultimate plans are for this to become a two-circuit line. Plans also call for a 345-kv line from The Dalles to the Portland area. Upon completion, this would give Bonneville 550 miles of 345-kv lines in the Columbia River basin.

Several Western utilities have made studies on the use of voltages in the area of 345 kv. There have been reports that Bonneville has considered 460 kv, which would make possible power transfer of 1,000,000 kva over a single circuit. Its experiences in the design and construction of the present line will be a valuable guide post in appraising the installed cost of a 460-kv system. With more and more of the extra-high voltages appearing, the day of a nation-wide grid at some yet untried voltage may be close at hand.

One thing is sure, higher voltage lines will play an increasing part in getting the West's electrical produce to market.

Autotransformer bank rated 600,000 kva, 230/345 kv after installation in BPA substation

Substation dead-end and switching structures for 345 kv. Notice the 230-kv by-pass line



Proper circuit presentation can save man-hours and avoid errors in every phase of design construction maintenance. Here's how one company has developed a . . .

New Look for Schematic Diagrams

Marvin Moler, Senior Electrical Engineer, Bechtel Corp., San Francisco

Engineering drawings and wiring diagrams for modern electrical installations can be both voluminous and complex. They take many man-hours both to prepare and interpret. Unfortunately some form of diagram is indispensable for a variety of reasons.

First they have to show the general functioning of units or groups of equipment. Second they must indicate the electrical interconnections between power sources, groups of equipment and the associated accessories such as protective equipment, control mechanisms and indicating devices. Third they must provide field construction forces with the data necessary to physically install and check the equipment and circuits. Finally they are invaluable in future maintenance and repair operations.

Long ago some unsung genius recognized the need for something simpler and easier to read than the formal wiring diagram. The result was the elementary diagram. It proved to be a very helpful tool but it still left a wide gap between the oversimplified diagram and the overdetailed formal diagram. This gap now appears to be partially bridged as the result of studies by engineers of the Bechtel Corp. who set out to explore ways and means of adding as much detailed information to the elementary diagram as could be incorporated without destroying its greatest assets, i.e., simplicity and ease of understanding. In so doing they have created a highly refined form of engineering communication that has proved so satisfactory that it has been incorporated as a Bechtel standard design procedure. It is sufficiently unique to be considered as a new technique.

Basically, the procedure consists of taking an elementary wiring diagram and, by means of functional groupings and proper nomenclature, evolving a single simplified schematic that:

(1) Shows the manufacturer of equipment the functional performance characteristics required from a piece of equipment.

(2) Indicates the over-all functional performance of the devices in a given grouping of equipment.

(3) Enables the preparation of detailed circuit schedules for use both in material take-off, estimating and by the field construction forces.

(4) Provides the data for preparing conduit schedules and layout drawings.

(5) Automatically gives the client a simplified sheet that will expedite repair and maintenance procedures and possible future plant remodeling.

The new type of schematic diagram has other advantages in that it is easy to check for faulty operations or sneak circuits, makes subsequent changes in design with a minimum of research, and eliminates the need for incorporating manufacturer's wiring diagrams into basic construction drawings. Manufacturer's wiring diagrams are used as supplements to, rather than being incorporated within, the formal and finalized simplified schematic wiring diagrams.

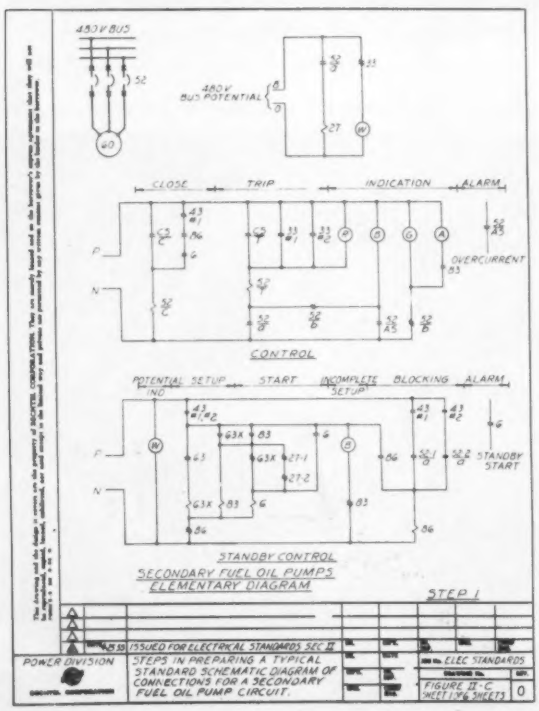


Fig. 1—This is the basic elementary diagram for a pump motor circuit

Preparation

The preparation of these diagrams follows a series of orderly steps. The first consists of building a basic elementary diagram that visualizes the functional operation of the electrical components of a particular electrical system. It may include one or more associated control circuits. On each diagram the functional groups are separated and clearly identified to show the performance requirements such as "close," "trip" and "indication." Contact points are identified by standard NEMA numbers indicating that a particular set of contacts is a part of a standard item such as a pressure switch or overload relay. (See Fig. 1.)

The second step in the development

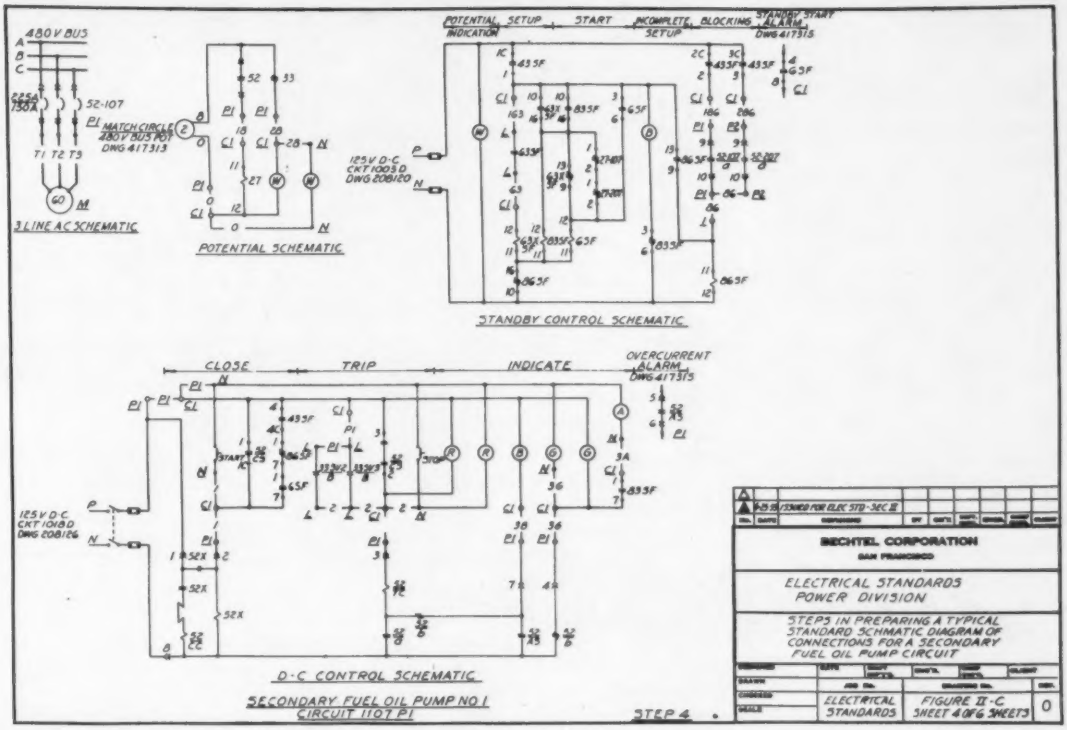


Fig. 2—The elementary diagram has been expanded without changing its basic appearance. Here, however, the circuits have been separated, the position identification for each group of components has been added. Circuit numbers have been included and all of the data necessary to prepare a circuit schedule are incorporated. The "one-line" appearance prevents circuit errors

of the diagram adds duplicate points of control where appropriate and indicates the location of all devices by means of a predetermined letter number coding system established when the general plant layout is made.

Subsequent steps include expanding the diagram by grouping power and control circuits so as to indicate interconnecting wires between equipment locations. After this has been accomplished, the diagram is identified by a title and by its prime circuit number. The latter is determined from standard identifying code symbols that indicate the specific unit involved and its location in the plant. Similarly all devices are numbered and all terminal blocks and terminal points given identifying symbols, which may consist of a number or letter or both.

CIRCUIT SCHEDULE — OLIVER PLANT

BECHTEL CORPORATION — PUBLIC SERVICE

REV.	CIRCUIT NUMBER	FROM	VIA	TO	CABLE DESCRIPTION						
					NO.	CONDUCTOR	SIZE & REELNO	INS.	VOLT.	APPROX. LENGTH	SPARE WIRES
		EXAMPLE I - POWER									
	1102H	2400 V. SWGR. CUB. #2	CONDUIT 1B279	480 V. TRANS. #1-1	3	1	3/0 (2)	RUB.	5000	132	—
		EXPLANATORY NOTE:	ON FIRST ISSUE CIRCUIT NO. 1102H GOES FROM CUBICLE NO. 2 OF THE 2400 V. SWITCHGEAR TO THE 480 V. LOAD CENTER TRANSFORMER NO. 1-1 IN CONDUIT NO. 1B279. THIS CIRCUIT IS MADE UP OF THREE SINGLE CONDUCTOR, RUBBER INSULATED, SIZE 000, 5000 V. CABLES APPROXIMATELY 132 FT. LONG. THIS CABLE IS TAKEN FROM REEL NO. 2						
		EXAMPLE II - CONTROL									
1	1102HII	2400 V. SWGR. CUB. #2	TRAY AB, AD	MASTER CONT. BD.	1	7	12 ( )*	RH-RW	600	260	1
		EXPLANATORY NOTE:	ON FIRST REVISION CIRCUIT NO. 1102HII GOES FROM CUBICLE NO. 2 OF THE 2400 V. SWITCHGEAR TO THE MASTER CONTROL BOARD BY WAY OF TRAYS AB AND AD. THIS CIRCUIT IS MADE UP OF ONE CABLE APPROXIMATELY 260' LONG CONSISTING OF SEVEN NO. 12 CONDUCTORS WITH 600 VOLT RH-RW INSULATION. THERE IS ONE SPARE WIRE IN THIS CABLE. * SEE ELECTRICAL STANDARDS SEC. I PAR. 10.4						

Fig. 3—Circuit schedule showing the completeness of the data that aids construction forces to wire groups of equipment with ease

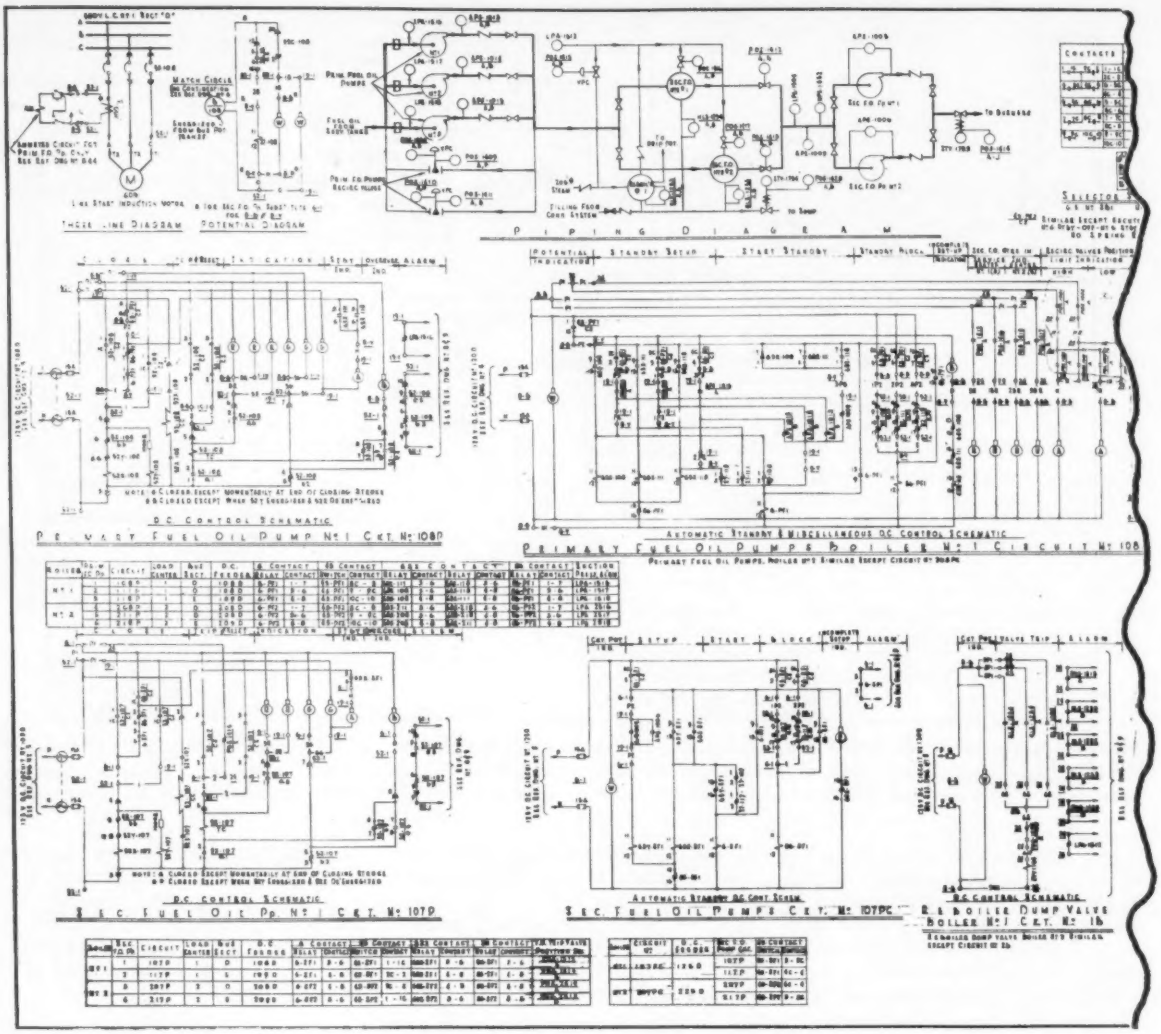


Fig. 4—This is the completed schematic diagram for the connection of electric fuel oil pump circuits in a power station. Although simple in appearance, the diagram shows performance characteristics, wiring details, operating sequences, location of equipment

At this point the basic elementary diagram has not changed particularly in appearance but sufficient coded information has been added to it so that the complete electrical circuitry can be visualized and identified. (See Fig. 2.) For example, each interconnecting wire between the two locations can now be identified by the circuit number, location symbol and a specific terminal point identity. The number of individual interunit circuits (all of which are similarly identified) can easily be determined and a circuit schedule prepared for the field construction forces. This circuit schedule lists each circuit by number, shows its originating and terminal points, indicates the number and type of conductors and the specific conduit, tray or raceway in which it is to be laid. (See Fig. 3.)

In the actual construction of the plant, conduits and trays are installed from a schedule and each is clearly marked with its predetermined code number. When the electricians start to pull the circuits as indicated in the circuit schedule, they merely locate the right numbered conduit and pull the specified type and number of cables. Then each wire in the conduit is identified at each end with its circuit identification number. When the apparatus arrives and is ready to be connected up, it is merely necessary to match each wire symbol with the corresponding number or symbol on the terminal blocks of equipment at each end of the circuit.

The schematic diagram is completed (1) by adding contact developments and escutcheon indications for all manually operated and rotary-type switches included on the control panels associated with the circuit; (2) a device table containing a complete description of the device; and (3) when necessary, a simplified piping and instrument diagram showing the basic components of the mechanical system being controlled by the simplified schematic diagram.

The completed schematic diagram (Fig. 4) is easy to comprehend, yet contains all of the essential information required for installation and start-up. The layout is also ideal for future modifications as well as maintenance, testing and repair. The Bechtel engineering staff has found this type of diagram to be a timesaver both in the office and in the field, as well as meeting with the complete approval of its many clients.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Back to work

The captains and the kings depart. Conventions are over and everyone back trying to finish the year with a little net. Inspectors, contractors, wholesale distributors, even unions with their progress meetings, are back at work. The rest of us, with elections over, will have less talk and more action.

Hot wires

Wire tables in the National Electrical Code at last will receive the benefit of some unemotional field data. Of particular importance in California where the State Safety Orders have never recognized the 1940 code wire table changes may be the results of a comprehensive study made at the behest of the American Iron & Steel Institute by Underwriters' Laboratories. The results were presented in the transactions paper at the AIEE fall general meeting in Chicago, Oct. 1-5. It is titled "The Heating and Mechanical Effects of Installing Insulated Conductors in Steel Raceways." Results will be made available to panel 8 of the National Electrical Code committee, "With a View Toward Improvement of the Code Requirements."

All helped

"One of the unique factors of the investigation was the cooperation of all segments of the electrical industry through the formation of an advisory working committee," the report states. "Wire, wireway and cellular floor metal manufacturers provided the large amount of materials necessary for the investigation. A qualified electrical contractor, under the auspices of NECA, worked with the laboratories engineers in the conduit pulling test installations so that they would be comparable to typical installation practice throughout the United States." An analysis of the paper and its significance will be run in the next issue.

Contest is on

A nation-wide residential Christmas lighting contest is again being sponsored by General Electric Co. this year. A booklet on how to conduct the contest is available, detailing how civic organizations can run such a contest and be eligible to participate in the $5,000 in prizes on a national scale.

Hold back

Joint industry boards between the contractors and local union, supported by funds from both union and contractors and written into the wage agreement, do not seem to be looked upon with favor by the international office of IBEW, the NECA convention was told by Robert E. Noon, assistant to President Freeman. A few localities had written these into the latest agreement in order to finance apprenticeship activity and even provide some funds for participation in industry sales promotion work. These have been turned down by the IO. Noon's explanatoin was that IBEW headquarters did not want local officers to lose any authority by pooling with contractors. However, precedent has been set in its pension program and in many health and welfare and vacation pay setups, especially where the employer does most of the paying.

Visiting electricians

From England to attend the NECA convention came three officers of the counterpart association of England, the Electrical Contractors Assn. They were A. D. Middleton, its president, L. C. Penwell, secretary-director, and Joseph G. Briggs, chairman of the executive committee and past president. They were guests of Ed Buttner of Oakland, who had been a guest of their convention two years or so ago.

Business power

A long-wanted commercial-institutional adequate wiring program is in the making and is promised in 1957, by a National Adequate Wiring Bureau task group. It is being developed after a survey of the country as to what types of occupancies can best be promoted. These surveys indicated a great need in commercial and institutional occupancies. Apartment houses are the most handicapped in the use of electricity because of poor wiring, the survey showed; retail establishments the easiest to improve by wiring modernization. Office buildings not only provide the greatest ease in making sales but also in rewiring sales. Initially the program will emphasize work in existing structures rather than new ones and the term "Businesspower" may be coined to use as Housepower is for residential rewiring.

Stock, not make

National Electric Products Corp. will substitute a new warehouse in the Vail Field central manufacturing district in Los Angeles about Nov. 1 for the Torrance plant, which will discontinue production. The warehouse will be used as an extension of factory stocks to serve regular distributors.

New bureaus

A new Adequate Wiring Bureau has been organized in southern Arizona, with headquarters in Prescott, to cover areas around that city, Cottonwood, Flagstaff, Winslow and Holbrook. . . . A new Certified Lighting Bureau has been started in Spokane by the Inland Empire Electrical League.

Light on its growth

Sylvania Electric Products celebrated the opening of two new California distribution centers, one in Los Angeles at 6505 E. Gayhart St., off the Santa Ana freeway near Washington Boulevard; the other the San Francisco region, at 1811 Adrian Road, Burlingame, in the new Millsdale industrial tract off the Bayshore Highway, at Millbrae. The Los Angeles opening was held Oct. 5, that in San Francisco Oct. 9. Attending the open house ceremonies were F. J. Healy, vice-president and director, C. A. Haines, vice-president and manager of facilities planning, and Garlan Morse, recently made general sales manager, lighting division, formerly director of Pacific Coast sales.

Western link

Another Sylvania announcement was that Carl S. Long Jr. has been made district sales manager of lighting in Denver, and reports to William Friend in San Francisco, thus bringing Denver back into the West. It formerly was in the Kansas City district. Long, some years ago, was in San Francisco itself.

Code analysis

"Analysis of 1956 Revision of the National Electrical Code" is being made available by the National Electrical Manufacturers Assn. at 25c a copy. For 25 years the NEMA has provided such reviews of code revisions.

Line shift

Graybar moved B. F. Keyfauver from Phoenix, where he was manager of the Phoenix branch, to Los Angeles as district sales manager and Rube Carlson from Butte to Phoenix. Keyfauver has been in Phoenix since 1937, where he began as a warehouseman and kept rising to become operating manager in 1943 and in 1953 manager of the house. R. J. Carlson started in Seattle as a counterman in 1934 and has been manager of the Butte house since 1952.

Manager moves

Among NECA chapters there have been some chapter manager changes. Bob Burns is now manager of the Montana Chapter with offices at 421 Medical Arts Bldg,. Butte. He was formerly from Spokane . . . ; Maynard Sundt was recently appointed promotion manager for the Puget Sound Chapter in Seattle . . . John R. McManus left as manager of the Redwood Chapter in San Rafael to joint Arthur E. Rowe in the San Francisco Bay area bid depository. No successor has yet been named . . . Warren Penn, manager of the Los Angeles Chapter, NECA, and his wife are making an extended trip to Europe, covering 11 countries.

More changes

Some moves—Automatic Switch Co. moved its office and warehouse facilities from East Third Street in Los Angeles to 1233 Goodrich Blvd. in East Los Angeles, where it occupies the entire building with more than four times as much space, according to Frank E. Reeves, district manager . . . C. D. LaMoree Co. has moved to 2433 Birkdale St., Los Angeles.

Represent the West

Two Western league managers were named to the officers and board of the International Association of Electrical Leagues, which met at Detroit Oct. 3-6. Glen L. Logan, manager, Los Angeles Electric League, is vice-president, and Bert W. Reynolds, Northern California Electrical Bureau, is chairman for Division 4. Discussion of ways in which leagues can coordinate the industry in furthering both the Housepower and the Live Better . . . *Electrically* programs were important topics on the program and in the managers own sessions at this convention.

Still important

A little late, we learned the results of the election of officers of the Montana Chapter, International Association of Electrical Inspectors. Otis Ryatt of Great Falls was elected chairman; John Guinn, also of Great Falls, vice-chairman; and F. C. Foucher of Lewistown secretary-treasurer. The new proposed state inspection law was one of the major items of discussion. Harvey Stone of Helena and Eldon Shirley of Billings were appointed to work with other organizations and promote the legislation. Shirley was chairman of the chapter last year.

Moves

Incandescent Supply Co. has opened a new and larger building at 1800 24th St., Sacramento. The move was made from 2111 Q St., where small quarters were being occupied. John Jennings is the branch manager.

Had you heard?

Among inspectors—Charles R. Pierce has been appointed chief electrical inspector of Fresno, succeeding the late Ray Colby . . . Loran M. Christensen chief electrical inspector, Salt Lake City, is running for the school board of that city . . . John Thomas Carey, chief inspector of Honolulu, was stricken with severe internal hemorrhages and was hospitalized early in October. This was shortly after he had announced he would not retire for several years yet.

Others mentioned

News of people: Bob Knerl left Anaconda to take a position with Automation Products Inc. at Glendale . . . Bill Pendleton and Vic Sheffield, formerly with Essex Wire Co., which sold its insulation and wires section to Minnesota Mining Co., will remain with the new company. Paul Borck and Lloyd Taylor will remain with Essex Wire . . . Lloyd T. Cramer has been appointed northern California and Pacific Northwest district sales manager of the Westinghouse Elevator Division and John E. Noren Jr. as Pacific Coast regional elevator service manager. William G. Heath was made Los Angeles district manager, to succeed Herbert C. Galitz, who was advanced to a new job in Dallas, according to Gano R. Baker, regional manager . . . George Palka, formerly of Kirk-Palka, has been named district manager for the Delta-Star Electric Division of H. K. Porter Co., with offices in the Broadway Arcade Building, Los Angeles . . . William E. Kirk has formed a company to do sales engineering work in electrical and mechanical equipment for utilities and industrials. His address is 415 Wall St., Los Angeles . . . King D. Christopher, formerly Los Angeles district manager, has been appointed general manager of a new Clark Controller Co. division, with manufacturing facilities in Los Angeles . . . Don Larson, who had been general manager of the West Coast Electronic Manufacturers Assn., has been named business manager for the Western Electronic Show. He was formerly with Hoffman Electronics Corp., Los Angeles . . . Robert Strachan of General Electric Supply Co., Salt Lake City, and Charles Goodwin of San Francisco were among many G-E Supply executives attending an advance management training school at Crotonville, N. Y. . . . Robert McCandless, formerly with H. R. Bente & Associates is now with the University of California at Los Angeles, Division of Architects and Engineers.

Even payments

British Columbia Electric Railway has advised contractors of a new budget billing plan available to customers using residential electric space heating. The company estimates the cost of electricity used for heating and other needs covering a 10-month meter reading, between September through June. The estimate is divided into 10 equal payments and the difference between that used and the amount billed is made up in the July bill. This enables a customer to space out his heating bill equally for the year.

Meter cans

Pacific Utilities Electric Service Requirements Coordinating Committee has just issued 10 new sheets to revise or replace existing sheets in its service requirements standards. They cover self-contained meters in switchboards of various types, transformer mounting bases, meter test switch covers, meter loop boxes. The standards apply to most of the serving agencies in southern California, Arizona and southern Nevada, and Hilo Electric Light Co.

Revised advice

"Safe Practice for Hospital Operating Rooms" has been revised and is now offered again by the National Fire Protection Assn. as its pamphlet No. 56, cost 25c. It may be ordered from NFPA, 60 Batterymarch St., Boston 10, Mass. Significant changes to bring it up to date are uniform electrical receptacle and attachment plug requirements to eliminate previous confusion and temptation of do-it-yourself electricians to alter the equipment.

Easier calculations

Two new reports from the Illuminating Engineering Society will prove useful. The IES report for lighting of commercial kitchens, 15c, and a report on "Calculating Coefficients of Utilization" at 50c provide new simplified methods for calculating and designing lighting for the respective categories.

Light but strong

New compression-type connector tools developed by Thomas & Betts Co. have been demonstrated to electrical groups in the West by John C. Kaufman, product manager of Elizabeth, N. J. He made presentation at the Northern California Chapter, IAEI, among others. The new, much lighter weight and versatile tool with lugs and connectors, and a new hydraulic head, offers possibilities for a coming greater use of aluminum wires and cables.

Man in charge

Alan J. McCutcheon Jr. has been appointed to succeed Carleton Bunce as coordinator of the Electrical Contractors Division of the San Diego Bureau of Home Appliances. Bunce became Smoot-Holman Co. representative in the area in September. McCutcheon has handled the Housepower program for San Diego Gas & Electric Co., which will be integrated into the activities of the contractors division. Annual meeting of the division was held Oct. 30, with an accompanying display of construction products as in the past years.

Two winners

Bill E. Jones of Smoot-Holman Co., Inglewood, was the first prize winner in the national "Most Interesting Job" contest at the Illuminating Engineering Society's annual technical conference at Boston, Sept. 17-20. He described the design of lighting for the Air Research Co.'s engineering office in Los Angeles. Second prize went to another Westerner, Dorothy McGregor, British Columbia Electric Co., Vancouver, for lighting design in the "Ease of Living" home in Vancouver.

Glue it tight

A plastic pipe made by American Molding Co., San Francisco, from a styrene synthetic rubber compound, is finding popular use for underground electrical system applications throughout the Bay area. It has been submitted to Underwriters' Laboratories for testing, although no standard test method or standards have yet been set up for such a product. It is not a fiber or asbestos conduit. Joints are fused together chemically and make a waterproof seal. It is particularly effective where the ground is very corrosive. It is used strictly for underground as under certain conditions the material will support combustion. Surprisingly light weight, even 20-ft lengths are easy to handle, quick to install. It can be cut with a hack saw or wood saw.

Quicker joining

Anaconda Wire & Cable Co. has announced a new film-insulated solderable magnet wire called Analac, which can be used without removing the insulating film to make joints either during the winding process or when attached to lead wires or some other conductor. Analac is colored a distinctive bright red.

It's working

Financing of residential wiring is going well, according to a 6-month report of Portland General Electric Co., aimed primarily at residential wiring and water heating financing, 72 contractors in July did $13,837 worth of wiring and plumbing and for the year to that date it totaled $113,227 worth. Since the inception of the program, $374,417 worth of wiring and plumbing had been financed.

Big job well done

Portland's school relighting program has practically been completed. This included changing the lighting of all the existing schools, as well as repainting the walls and improving the reflectances, a total of more than 2,000 classrooms. In the state, 3,000 total have been remodeled, patterned from the Portland program.

Bring in the sun

A sunshine room appeals to many in the often overcast climate around Portland and many installations have been sold as a result of displays at last year's Parade of Homes and the promotion of Portland General Electric Co. A sunshine room involves the installation by a contractor of circuits of infrared and sun lamps, usually in the ceiling and under timer-switch control. It is a new source of business for electrical contractors.

Back in the fold

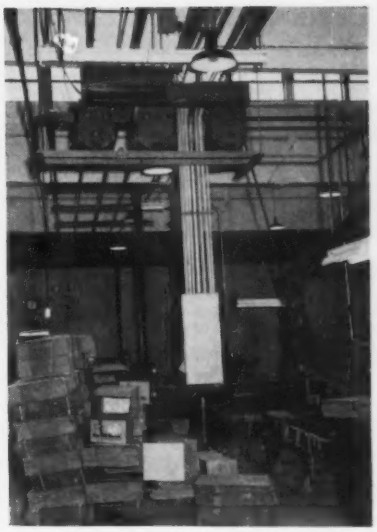
San Francisco electrical inspectors, long inactive in the IAEI, turned out in force for the Southwestern Section meeting in Berkeley, indicating a renewed interest and participation by this once active group. Jim Graham, chief, Vic Delabar and Walter Smith were regular attendants and others of the San Francisco department force attended some individual meetings.

Another try

Code work in the Utah area has accelerated and there is even hope that the state law, vetoed by Gov. Bracken Lee, can be reintroduced at the next legislature with better success. Governor Lee was defeated for renomination at the primaries in September. Working for codes has been the Intermountain Electrical Assn. code committee of which Lloyd Shipp was chairman. Davis County adopted the code worked up for Salt Lake City and so did the city of Ogden. Salt Lake County may soon adopt it.

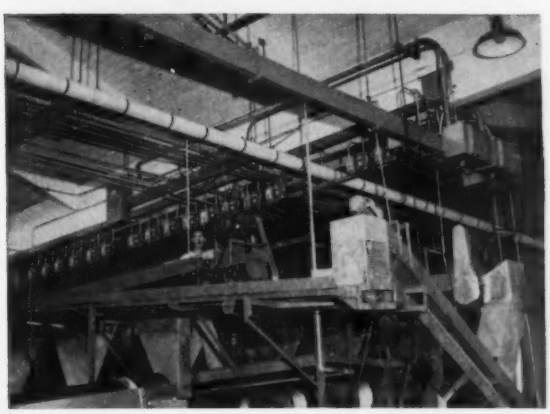
Make it a big event

Electrical Week, next February, will have far more whoop-de-do than last sad season. All of the big manufacturing companies will salute the week over their radio and TV network programs. Newspapers and magazines will cover the event on the national level. The electrical leagues, inspectors associations, contractors associations and electric clubs and others are being alerted to make the most of it at the local level.



Main board on a balcony distributes to bus duct runs for power and for lighting to dry-type transformers, all by overhead conduit

All Overhead in This Cannery



Bus duct feeds gutters above each line for motor switches, controls

Leaving the floor free for materials, machines and men, and permitting it to be washed down, all electrical facilities were installed overhead when Northwest Packing Co. rebuilt after a fire at its Portland plant on Columbia Boulevard. Consulting Electrical Engineer Fritz Klawa designed and Ace Electric Co. installed a combined conduit, bus duct and bus gutter job that, like the can conveyor lines, is all up out of the way.

From a 150-kva transformer bank on a concrete mat outside, the main switchboard on a balcony inside the building at about the center is served by conduits over a bridge spanning the driveway. From this main board conduit runs are made to three sections of 1,000-amp bus duct, one of which reduces to 600 amp by means of a reducer section. This bus duct runs at right angle to the machines. Taps to the bus duct are made as required to supply lines of canning machines from a bus gutter. Switches and starters are installed along these lines of 4x4 gutter, which parallel the machine lines. The gutter serves to carry the bus conductors from which the motor circuits are tapped. All of the conduit, bus duct and gutter is supported on rods and Kindorf fittings suspended from the roof purlins. A diagonal strap is run from the bus duct to the purlins as a side brace.

The motor load is carried on 240-v, three-phase circuiting. To obtain 120/240 v for lighting a bank of dry-type transformers is mounted on a platform on one of the roof-supporting pillars near each end of the building, with the lighting panel below it. All motor control centers, however, are located on catwalks above the lines of the canning machinery above the wet area.

In the wet area FD-type boxes are mounted with the opening facing down and equipped with Arrow-Hart No-Trak receptacles. A 100-amp Feedrail is used to power a movable crane over the kettles. High-capacity fuses protect the main service.

Electrical West—Vol. 117, No. 5

Grounding, Center of Confusion—10

Means of Ionizing the Air

Tom Hughes, Electrical Engineer, California Division of Industrial Safety

Our purpose is to make the air conducting and we stated that humidified air or dusty air (with conductive dusts) is only conductive by virtue of the material in suspension. Ionized air is a conductor in itself by nature of its free electrons but remember that ionization only exists within the range of the source of excitation or bombardment.

Ionizing is the cleanest and most foolproof means of making air conducting but humidified air has the virtue of uniform consistency throughout the area where it is to be used. Ionizing requires frequent applications within the confines of the machinery and this would be next to impossible in the complex setups of textile machinery. Humidification can be applied to the air in a separate room and remain effective throughout the processing.

In most factories the points where static is a problem are relatively isolated and it would be impractical or too expensive to attempt to humidify all the air. Even the building has to be designed to maintain the air conditioning in the required state. So we must be content with ionizing of selected strata.

The first method we shall consider is not exactly ionization in the sense of freeing electrons of the adjacent air. Instead, a liberal supply of positive or negative charges is contributed to the air by establishing a high-voltage field between electrodes. One side of a high-voltage transformer (or d-c power pack) is connected to the part of the machinery in question and the other side is brought to a special electrode, properly spaced from parts of the machine.

The special electrode consists of needlelike points spaced along a mounting strip and capacitively coupled with the carefully insulated feeder concealed in its base. The voltage employed usually ranges from 5 kv to 15 kv where a-c is used.

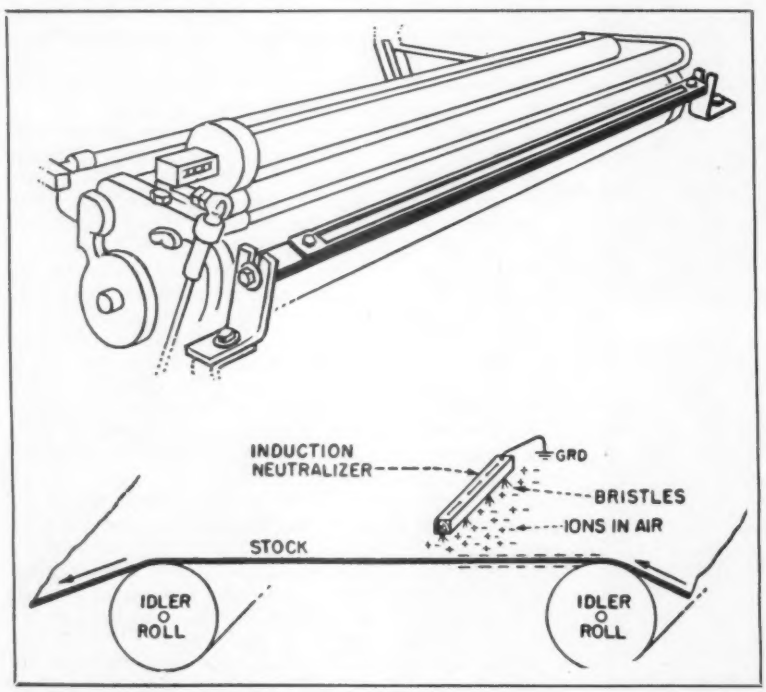
The other two methods employ a means of ionizing the air by bombardment of its atoms. Let us take a closer look at these needles employed as electrodes. From the early days of lightning rods the rods became known among physicists as air terminals.

Going back to the conductor, whose atoms had lost some electrons to the dielectric substance during separation of their surfaces, we remember that there was an electrostatic field established between the two substances. With a great enough charge, the two bodies actually are physically attracted toward each other by the charge. But the dry intervening air is offering no path for an intercharge of the oppositely charged particles.

Suppose that we take a needle (2 or 3 in. long) of copper or brass and attach its base to the conductor containing the surplus of positively charged atoms. Immediately positively charged particles rush out along that causeway. By the time they have traversed the miles of distance (in proportion to their size) to the pointed end they have attained such a velocity that they are ejected into space (the surrounding air). These heavy positive particles bombard the atoms of the air and knock off electrons, thus making the stratum of air within their range a conductor.

If this ionized stratum of air extends from one charged substance to the other, the charges will quickly dissipate and neutralize the two substances. Similar needles are used as air terminals on the trailing edge of some airplane wings and the same principle is applied by lightning rods. In the case of lightning rods, the stratum of ionized air can not possibly extend to a charged cloud but serves only to assure the passage of any striking charge to the rod rather than the building.

This principle of air terminals has been applied to industrial static problems by mounting a row of such needles along a rod or bar of insulating material and running a bond wire from their bases to the frame of the machine. Where the stock being processed passes over or between rollers, one of these static neutralizer bars



Upper drawing shows a polonium bar positioned near the rolls. Lower drawing shows the principle involved in placing neutralizer bar near the charged material. This type utilizes the charge on the machine to ionize the air. Other types use high voltage

(as they are called) is positioned near where it leaves the roller.

The optimum position for placing of any type of neutralizer is established by use of industrial electrometers (electronic devices for measuring the voltage gradient of the electrostatic field between any two charged bodies).

The last method to be considered is by the use of radiation from radium or polonium. Radium must be handled and treated with greater care because it emits alpha, beta and gamma rays. Polonium is a by-product of radium and emits only the fairly harmless alpha particles. If it were not for its toxic properties when breathed or ingested, polonium could be handled without much concern. Any users of polonium neutralizers must follow the manufacturer's directions and warnings.

Polonium is used in two ways. Normally it is attached to the neutralizer bar on one side and a thin coating of gold is plated over its layer to secure the substance for safety's sake. Such a neutralizer bar is positioned in the same manner as other types.

The other way that polonium can be used is of special advantage where the static charge is causing trouble amid closely placed parts. Instead of attempting to bombard the air among the parts, the polonium is placed in a special nozzle and used to ionize a stream of air which is then injected among the parts.

Choice of Methods

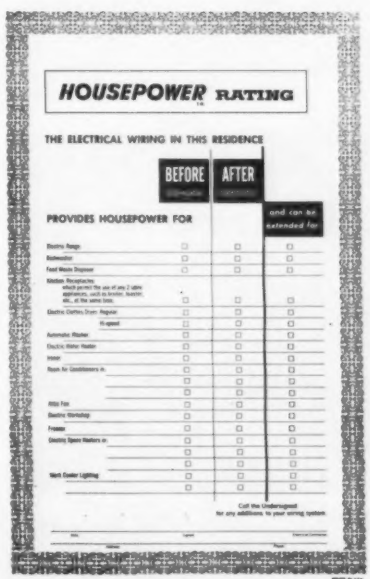
All three of the static neutralizer bars are manufactured by different companies, ready to be installed. Each type has advantages and disadvantages. The cheapest and most durable type is the one that employs a row of air terminals fed by a bond wire from the machine's metal parts. One company uses a row of bronze wire bristles grouped in tufts like the bristles of a scrub brush and spaced along a wood rod.

This neutralizer depends on the electrostatic field of the charged bodies for its power to perform. Thus, the stronger the field the more zealously it performs. It can be used over moving stock such as paper, cloth, plastic, etc., or around belts and other such charged bodies. Apparently its only disadvantage is that it is not absolutely safe for use around ignitable vapors or dust clouds because of the possibility of some conductive tool or object bridging the gap and drawing a spark from it.

The neutralizer, which has a high-voltage supply, is relatively expensive to use if bars must be employed in several locations within a machine. It is preferred by some authorities because of the strong steady field it maintains. However, like the other neutralizer, it is not safe for use around ignitable atmospheres because of possibility of breakdown in the high-voltage insulation.

The neutralizer employing polonium for radiation is the only type we happen to know of that is absolutely safe for use in ignitable atmosphere because it doesn't depend on a flow of electrical charge for ionizing the air. Its chief disadvantage is that it is only effective over a gap of from 1 to 1½ in. and it loses its strength after a certain number of months. Its effectiveness must be checked from time to time with an electrometer (even as the other types should be) and replaced when necessary. It is relatively expensive and there is the possible toxic hazard from rubbing it in use or handling.

The use of the modern industrial electrometer offers no difficulty and every plant that is burdened with serious hazards from static should have access to one. It can be used while any process is in operation and held in any position that it is safe for placing one's hand. It doesn't have to be connected to or make contact with any object. If it were used carelessly the electrode on the end of its probe might bridge a small gap and cause a spark between charged bodies but there is little excuse for such handling.



HOUSEPOWER RATING

THE ELECTRICAL WIRING IN THIS RESIDENCE

PROVIDES HOUSEPOWER FOR	BEFORE	AFTER	and can be extended for
Electric Range	□	□	□
Refrigerator	□	□	□
Food Waste Disposer	□	□	□
Kitchen Receptacles which permit the use of any 2 table appliances, such as toaster, toaster-oven, at the same time.	□	□	□
Electric Clothes Dryer: Regular	□	□	□
15-speed	□	□	□
Automatic Washer	□	□	□
Electric Water Heater	□	□	□
Iron	□	□	□
Room Air Conditioners in	□	□	□
	□	□	□
	□	□	□
Attic Fan	□	□	□
Electric Workshop	□	□	□
Freezer	□	□	□
Cooking Space Heaters in	□	□	□
	□	□	□
	□	□	□
Work Center Lighting	□	□	□
	□	□	□

Call the Undersigned for any additions to your wiring system.

Make It Simple

At last there is a way to tell the homeowner and his wife what they want to know about wiring—"What can we use in our house easily and safely on the present wiring and what will we get by investing in more wiring?" To aid the electrical contractor to translate his know-how into what the customer understands, the National Adequate Wiring Bureau has available a "Housepower Rating Chart." On this the contractor can check quickly what the present wiring will serve. When additional wiring is installed, he notes on it what can now be handled by the wiring and in the third column shows what can later be added without increasing the main service. If the contractor keeps a copy he has a record of what he has put in for future reference and to make additions from as the customer may require. In national advertising the public will be urged to get their Housepower rating by getting an electrical contractor to check their wiring

Forums and a big skit were used to break up the association service story in many parts

NECA seeks to make a Business out of Electrical Contracting

All the tools with which to make electrical contracting a first class business instead of a gamble were exhibited for contractors to see at the 55th convention of National Electrical Contractors Assn., held the week of Sept. 23-29 in San Francisco. The trick is to convince them that it is a business and should be operated as such. But NECA never in its history had as dynamic and persuasive a president to lead its members out of the wilderness of crazy competition as it has now in Oliver F. Burnett of Kelso-Burnett Electric Co., Chicago. (See p 87.)

These tools—a public relations program, strong legislative representation, the best tie-in NECA has ever enjoyed with the industry's big national promotion, educational facilities on estimating, accounting, job management and business administration, code representation, an apprenticeship and labor relations joint activity with the union—were offered to the 1,500 contractors (who with their wives totaled a registration of almost 2,500) attending from all parts of the nation.

In another part of the Civic Auditorium contractors could see the newest materials and supplies to be used in installation. A second national electrical exposition of wiring materials was staged by manufacturers as a corollary to the mental tools offered by the officers and staff of NECA in the main auditorium.

So it was all there for them to absorb. They could take it home with them to put into effect and aid them to "fill the need" that President Burnett depicted so eloquently. He warned that, if they did not fill it, somebody else would. In these times of a revolution in distribution and integrated corporate organization his warning had more than mere words back of it. Electrical contracting could be absorbed into some other type of construction organization than the traditional pattern of individualistic units.

By preparing more skillfully through the full use of the association's several services such a possibility may be halted. This was pretty much the main thought that was expressed as the convention theme, "The Need—Who Will Fill It?"

"What Did You Get Out of It?"

To answer the inevitable question of those who did not attend the convention "What did you get out of it?" the following "estimate" is tabulated to answer specific interests. Returning delegates sometimes only report the social activities, of which there were many at the San Francisco occasion, but are vague on details of the program itself. This may reflect the degree of absorption of such a heady program. This estimate, therefore, is of what was there for the taking, all of it significant to the future of the electrical contracting business.

Retired Larry Davis, former NECA manager, was given honorary member certificate by Clyde L. Chamblin, the 1927 president

The two most significant changes brought about by this convention, as affecting the West at least, were the separation of the line constructors into what is virtually an affiliated association of its own within the NECA. The other was the accomplishing of a new District 9, made up of California and Nevada, leaving District 6 to comprise Washington, Oregon and Alaska.

The third contemplated change did not come off. It was a proposed change to the constitution, with accompanying by-law changes, to empower the national association to establish branches answerable directly to NECA headquarters. While the administrative committee recommended the change and the board of governors approved it, after a debate over putting limitations on it, when it reached the floor a motion was introduced to defer a vote on the amendment until next year. This would enable further study of the measure and possibly more acceptable limitations incorporated in the proposed by-law changes.

The measure provided that branches would each have a voting governor, the same as chapters, but that headquarters would select and direct the manager in the same way it does its

field staff. A limitation of 15 such branches was proposed to the governors by Edgar Buttner of Oakland.

Line construction was separated into chapters of its own, in order to bring more of this work within the jurisdiction of NECA. Both dues and major interests of the regular chapters were considered incompatible with the needs of the line contractors. The board of governors authorized formation of line construction chapters and eight will be established, to cover the United States.

In the West there will be a Rocky Mountain Line Constructors Chapter, with headquarters in Salt Lake City to cover Montana, Idaho, Utah, Wyoming and Colorado. The present Northwest Line Constructors Chapter in Portland will have Oregon and Washington. A new California-Nevada Line Constructors Chapter, based in Los Angeles, will cover California and Nevada. Broad area labor agreements will be sought in such areas and it is hoped that an independent organization, the American Line Builders Assn., may join as a body. The dues schedule of 2/10 of 1% of productive labor pay roll will have a maximum of $1,000 and the chapters will not exceed one-half of 1%, with an annual maximum of $1,500 and a minimum of $260.

Federal Legislation—Another Try

After coming within a few house votes of getting the Federal Construction Act passed, the board of governors, where all the real convention business took place, took a look at the prospect of having the bill passed if offered again and decided to give it another big effort when Congress reconvenes. The measure, to stop the shopping and peddling of electrical subcontractors' bids by general contractors doing government jobs, was fought bitterly by the AGC and a number of government department heads.

However, it passed the Senate and received a majority of the House votes, although not the required two-thirds. The aid of other mechanical specialty contractors was had during the last year's fight and it is expected that such support will continue. This measure is one by which electrical contractors are fighting off absorption into another method of construction integration.

The new bill to be introduced will be simplified to a simple subcontractor listing bill. It will not require the general to list the amount of subbids in the first instance but will require that he do so if he wants to change and to make an account to the government for any changes that he makes.

Former President Robert W. McChesney asked for actual data on abuses by federal agencies in respect to contract payments, proceed orders on changes, arbitrary interpretation of specifications, delays in negotiated changes and no allowance for overhead. With such actual case histories, the association can better bring about corrections to the abuses.

Senator William Knowland of California addressed the Sept. 27 session, declaring that small business is and must retain an important part in the nation's economic system. Big business makes contributions but too much concentration encourages those who would have the government step in and take over.

The free enterprise system of partnership between worker, employer and investor has given the workers of America a greater stake even than that of the investors. No system of socialism, either Fabian or Marxian, has ever been able to equal the record. He also declared that high taxes took the incentive out of assuming new business risks that build new plants and enlarge existing ones.

Marketing This Industry

In a positive and forward thrusting rather than self-protective phase of the convention, a review of the electrical industry's big marketing programs was presented Thursday morning. Presentation leader was P. Howard Farley, NECA.

Housepower and the contractors stake in this Edison Electric Institute national promotion was presented by John S. C. Ross, Pacific Gas and Electric Co., San Francisco.

Explaining the Live Better . . . *Electrically* program R. E. Ingmire of New York City announced an electrical contractors' plan of action kit containing advertising materials by which a contractor can identify himself with the program. John Biggi, manager, Adequate Wiring Bureau, told of progress being made to develop a certifying and rating program for commercial and institutional rewiring. One with a simple approach and possible financing is being formulated, and may use the words "Businesspower" instead of Housepower to dramatize it.

It is time for the electrical contractor and the distributor to cease stumbling over each other and spending so much time in negative fighting, said A. E. Hooper, executive director, National Association of Electrical Distributors. The cause and solution for mutual problems usually ends in the same individual. Such problems as direct selling, take-offs for contractors, stretching of price, bid peddling and

Col. C. P. Bobe presents to E. R. Cornish membership plaque from Estimators Club. Cornish was once an Oakland estimator

New vice-presidents—R. Goold, Stockton, Dist. 9; Ralph Johnson, Denver, Dist. 8

District 6 Vice-president Wes Grasle and Phil Robbins, retiring v-p from District 8

From host chapter, San Francisco, its manager, W. J. Varley; Fred Wider, director

shopping are not caused by the economic situation but by weakness of individual operators. The only solution is by developing more integrity through a more positive approach.

The distributors will have packaged promotion programs to help contractors make the most of the industry's advertising promotions. A. T. Bertke, Norvell Ogden and Howard Farley described NECA's national advertising and promotion materials. Farley suggested the forming of a cooperative corporation to handle the residential modernization work in various communities.

In closing the market development program, Clyde M. Chamblin, San Francisco, past president of NECA, who presided, declared that the termites in the contracting foundation were greed, selfishness and the insane desire for volume. Friendship, among themselves as contractors and other branches of the industry, he said, would bring benefits to all branches of the industry.

Amusing skit by Cornish depicted plight of Confused, contractor, until he learned why

"To Get Educated"

A real lift to the difficult-to-make-interesting research and education activities of NECA was given by employing a clever opening skit and making use of what purported to be a super chapter meeting to get short, interesting reports of the various activities. E. R. "Al" Cornish, formerly of Oakland, now research director for NECA, titled his presentation "Why Technical Information and Training?" and began with a skit in the office of Confused Electric Co. in Any Town, U. S. A. The second act was a meeting of Any Town Chapter, NECA, that evening and the last act Unconfused Electric Co. one year later, after it had taken the cure.

Cornish acted as I Am Confused; Charles Hart, his son, Also Confused; Shirley Bell, the bookkeeper; and Ernest Weir as the superintendent. For the chapter meeting, a galaxy of notables in both NECA and the industry were arranged as in a chapter meeting and called upon for individual reports. W. P. Robbins of Salt Lake City acted as president of the chapter.

Both the educational courses—such as estimating, job management, accounting and soon one on blueprint reading—and the codes and standards work of the association were thus dramatized and made very interesting.

A number of new things were revealed, among them the following: a foreman training program in the Oregon-Columbia Chapter, developed by Laurence C. Rodgers, its manager; visual presentation methods for use at chapter meetings to teach and inform; revision of the labor units manual without the previous 50% markup for job factor; that panels will be set up similar to National Electrical Code panels on each part of the labor manual to bring it up to date.

Conduit Fill Study

An event of greater significance than realized by the contractors was the announcement during this session by Walter O. Zervas, research engineer, American Iron & Steel Institute. He told of the completion of tests by Underwriters' Laboratories at the behest of the institute on conductors in various types of steel raceways, including conduit, EMT, Q floor, metal gutter, underfloor ducts, etc. This will give Panel 8 of the national code comprehensive data on the effect of various loadings and insulations of these raceways in air, concrete, thermal insulation, etc.

Likewise, tests of the mechanical stresses on drawing in wire in runs of 100 ft with from one to four bends, with as many as 136 wires, using regular field methods for pulling, are incorporated in the study. An object of controversy ever since the 1940 tables were altered in the code, to derate conductors, this study may at last bring factual data upon which intelligent code revision can be made. J. A. McNabb, engineer, Underwriters' Laboratories at Santa Clara, described the methods used by UL in making the tests.

"Does Your Public Like You?"

Under this heading, the public relations activities of NECA were outlined by George P. Roscoe, director, and a panel upon which J. D. O'Connor, Sacramento contractor, discussed the importance of selecting qualified contractors to represent the industry in the governmental conferences affecting business. Don Larson, manager, Rocky Mountain Chapter, Denver, described local publicity. He suggested the chapter keep current pictures of its members, their business establishments and help them get publicity on good jobs done. Also successful were meetings of an educational nature with architects and consulting engineers and builders. He also urged contractors to participate in industry shows and activities, church and civic programs. But most important was to follow through and ask for the business.

Manpower and Labor

Unfortunately, to most contractors their labor problems seem more important to them than marketing their services, their public relations, or learning better ways to run the business. Perhaps it is, for without electricians to install what they have bid for they are out of business.

Hence, for the final general meeting devoted to labor, the maximum turnout filled the auditorium. They came to hear what Gordon M. Freeman, international president, IBEW, had to say. However, as a member of two important committees doing the merger of CIO and AFL, he could not make it. Instead, two of the top eschelon, Robert E. Noon, assistant to President Freeman, and Joseph D. Keenan, international secretary, IBEW, spoke for the union. William J. Cour, NECA labor relations director, prefaced the session by declaring that there was no place in this industry for a closed local union or a closed association. This referred to the need to enlarge the manpower pool by admitting more members to the union and having no

California Nevada Chapter conference met to decide whether to dissolve now that it has a brand new District 9 covering the ground

restrictive fences to keep contractors from belonging to NECA.

Significant views, which may be taken as official IBEW views, which were expressed by Noon for Freeman, were these:

1. That the case load of disputes sent to the Council on Industrial Relations continues to be too high and that the council was not established as a substitute for bargaining at the local level.

2. That certain electrical work has been placed beyond the control of the electrical contractor and other crafts are obtaining this (possibly referring to luminous ceilings).

3. That IBEW without fanfare is supporting the contractors in an effort to get legislation discouraging bid shopping.

4. That the union takes a dim view of any program where a joint industry board may be asked to substitute for the responsibility of local officers. No general policy has been pronounced as yet, but IBEW is inclined to discourage such proposals. Basically, no plan will be approved unless it encompasses a majority of employers and employees in an area.

5. That while there is no doubt of a manpower shortage, qualified mechanics cannot be mass produced and better planning is needed to prevent training more men than can be steadily employed. Nor is the union willing to dilute or shorten the program or to train men who will replace the opportunities of those who have given their entire life to the industry, but may not be physically vigorous as they once were.

Joseph Keenan, who was to speak of the effect of the merger of AFL and CIO, prefaced with comments about the impact of automation on industry and on job opportunities. He stressed the need to train electricians to do the maintenance and upkeep of such equipment, rather than letting it slip to some other group.

Of the residential market, Keenan regretted that so much of it was going nonunion and the modernization program might slip to gyp operators unless NECA and IBEW organized to control and police this market.

Of the merger, Keenan said that under present good employment conditions jurisdiction over construction work in industrial plants, organized under CIO unions, becomes less important and less conflict is anticipated. However, a joint committee of seven from each of the two union groups has been set up to settle any jurisdictional questions. He warned, however, that if contractors and the union do not work together to handle the work of industrial plants they may both lose industrial construction that they have only recently won back following the war.

Two other items respecting labor came up for energetic discussion at the board of governors meeting (opened for the first time to visitors) and mentioned later on the floor.

First was determination to conduct a survey of the entire manpower situation, with or without the help of IBEW, in order to guide the planning for manpower training and increase. This was voted.

Second was the question of contractors paying into the joint pension fund for their nonproductive employees who are A members of the union but whose rate of pay is not established by the local bargaining agreement. This had been protested by the Northwest Conference of Chapters on the basis that it might involve contractors in the bargaining with the union for such supervisory and management people.

Another important action taken during the board of governors meeting was the voting of a separate District 9 for California and Nevada, and selection by the administrative committee of R. Goold of Stockton as vice-president for the district for one year. Subsequently, both the California Conference of NECA Chapters and the Northwest Conference of Chapters in separate meetings considered whether to disband their conferences and operate as district councils. No action was taken, pending further study in each case. The conference of chapters originally was set up for more frequent meetings than a district meeting, and in order to correlate labor demands, state legislation and other local problems.

Two old-timers were signally honored by the convention. Clyde L. Chamblin, California Electric Construction Co., San Francisco, who was NECA president from 1927 to 1929, was asked to preside at one of the sessions and also to present the honorary membership certificates to four longtime workers. Among these was Lawrence W. Davis, retired and living in Oakland, former managing director of NECA from 1924 to 1947.

Host chapter, San Francisco Electrical Contractors Assn., opened the general convention. Emil J. Weber, its president, conducted the ceremonials and the welcoming program.

In the two adjoining halls of the Civic Auditorium the second National Electrical Exposition contained 132 exhibits of wiring materials and devices, tools and equipment used by electrical contractors in their business.

Entertainment opportunities were plentiful and the afternoons were left open for sightseeing. So large was the attendance that the banquet was conducted simultaneously in two of the city's largest hotels.

ELECTRICAL WEST

New Data for Circuits

DATA on the heating and mechanical effects of installing insulated conductors in steel conduits of various types are provided in a recent AIEE paper. The information adds substantial validity to the new wire tables of the National Electrical Code. Studies on which these data were based were sponsored by the American Iron & Steel Institute but conducted through an advisory working committee which represented all segments of the electrical industry. The studies, however, were not made with the view to verifying current provisions of the National Electrical Code. Rather the object was to compile information and test data which would be applicable to the determination of current carrying capacity and reduction factors for raceways carrying more than nine conductors. Studies on the effect of load diversity in reference to those current carrying capacity reduction factors and the conductor operating temperature were also made. In addition, the mechanical factors affecting the percentage of raceway "fill" of rubber or thermal plastic insulated conductors installed in multiple were investigated.

The essence of the conclusions from these extensive studies is as follows:

1. That the reduction factors, applicable to Table 1 of the National Electrical Code, for more than nine insulated conductors in a steel raceway give recognition to load diversity and be 70% for 10 to 24 conductors, 60% for 25 to 42 conductors, and 50% for 43 and more conductors.

2. That 40% raceway fill be used for all raceways, including wireways and auxiliary gutters.

Publication of these data is timely for two reasons. First, the imminent adoption of extensive automation throughout industry inevitably will result in a vast increase in the footage of multiconductor raceways. These are essential for control, indication, recording, feed-back and other types of circuits that will be an indispensable part of successful automatic production.

Second, it is all too often forgotten that the National Electrical Code is a *minimum* standard. Strict adherence to its provisions leaves no room for electrical expansion or growth. That is the reason why most progressive consulting engineers and far-sighted industrial managements insist on much greater conservatism in design than that permitted in the code.

A careful study of the detailed findings on the effects of heating and diversity resulting from this investigation leaves no doubt that present National Electrical Code wire tables are sound and that it would be most appropriate to incorporate the recommendations of the advisory committee into the code. The industry is indebted to the American Iron & Steel Institute and to the various individuals who represented the electrical industry in this effort for a valuable addition to the literature and data of the electrical art.

Training a Parade

EDWIN VENNARD, EEI's managing director, made a very cogent remark while addressing the Northwest Electric Light & Power Assn.'s annual convention recently. He said, "We must never forget that we are training a parade."

That statement could very easily be the keystone in the foundation of any successful and efficient business organization. It points up the fact that employee education and employee training is a continuing and important function at all levels of the organization. In fact, it is so vital that it has been suggested that much of it has to be done on company time.

While electric utilities have a fine record of longevity in employment, there is a continuing parade of people through the organization. There is a continual shifting of job responsibilities. There is a continuous procession of new internal and external problems which must be met and mastered by individuals, groups and, at times, by the entire organization.

All of this suggests that the breadth and scope of the required training and education within a utility organization today requires executive attention of the highest order, a

EDITORIAL VIEWS

willingness on the part of management to cheerfully accept the cost involved and the development of an attitude on the part of all employees that training and education is an essential and indispensable part of the job. This attitude must be particularly well inculcated at the supervisory level for they are the people who must take the time to train themselves and give the time to train others.

Shift in Emphasis

THE Federal Power Commission's annual report on production expenses points out a situation that demands increasing attention from utility management. Historically increased efficiency on the one hand and expanding energy sales on the other have teamed up to keep the rate curve sloping downward.

Our technology is still able to show improvements in production expenses. The Ohio Valley Electric Corp.'s Kyger Creek plant won the national honors in 1955 as the most efficient power producer, turning out a kilowatt-hour for 9.110 Btu. There are technical and economic limits to still further improvements in thermal efficiency, and gains in this direction become progressively harder to attain.

Consequently the emphasis must shift to the load development area if the traditional rate structure of the industry is to be maintained. It is quite possible that the same type of scientific approach will have to be applied to load development plans as has been used so successfully in developing the physical plant to its peak efficiency. It may be that more exacting load studies will be necessary in order to push the uses which will best fit in to the individual system load curve. It is conceivable that a high degree of mechanization in customer accounting plus accurate consumer demand and consumption figures combined with computer technology could provide management with accurate predictions and factual data that have heretofore been in the realm of educated guessing.

This does not imply that the utilities are not ready, willing and able to serve any type of load that customers may want. It does indicate a growing importance of commercial department activities and planning in the over-all scheme of things.

SPEAKING of standards, our great engineer president, Herbert Hoover, once said they have cheapened competition. They have cheapened the cost of production in millions of directions.

All this requires unselfish cooperation on the part of industry—both producer and consumer. We have their most competent materials experts and scientists as members (of ASTM) and over the more than 50 years of our existence this support has been unflagging . . .

The development of methods and specifications which are dynamic rather than static—subject to continued examination, revision and development—are the keystones to the orderly advancement of our economic as well as our technological progress . . .

We are also at a critical period in our technical and industrial development. Before the turn of the century, a prominent English writer observed: "The fact is that civilization requires slaves. Unless there are slaves to do the ugly, horrible, uninteresting work, culture and contemplation become impossible."

Human slavery is wrong, insecure and demoralizing. On mechanical slavery, on the slavery of the machine, the future of the world depends. In sight are great developments where the slavery of machines will still further free men and contribute to a fuller life and more leisure. Yet we are unprepared for it. We face a continuing labor shortage and educational crises. This is of concern to our society and to all industry; and a challenge for us to do something about it—R. A. Schatzel, vice-president, Rome Cable Co., and president of American Society for Testing Materials, addressing the annual convention of that association in Los Angeles, Sept. 19, 1956.

Jack Ross, Marvin Jankelson joined forces

Shirtsleeved salesmen watch cooking demonstration on table appliances by Mrs. Fenner

Marguerite Fenner put on a typical cooking class to show them the story that women hear

Magician Bob Haskell used tricks to emphasize points in the wiring Housepower story

Incandescent Supply's

Gets Hep

A first in this business is rare but Incandescent Supply Co. in San Francisco earned the title when Marvin Jankelson, its president, took the initiative to bring his entire sales force and the industry's Live Better—*Electrically* and Housepower programs together. They did come together, learned about each other and both are the better for it today.

It was the first time that an electrical supply distributor himself called such a meeting and asked the utility to present to his staff a complete story on these programs sponsored by the entire industry. Pacific Gas and Electric Co. and the Northern California Electrical Bureau responded and the affair was such a success that they hope other distributors will call similar meetings.

A member of the Northern California Electrical Bureau for years and active in its committees, Jankelson himself heard the original presentations of the LBE program and of Housepower but wondered how he could arouse enthusiasm in them among his salespeople. Here were important national programs with big-time advertising designed to aid the distributor's personnel in the field to sell the means whereby the public can Live Better—*Electrically* with plenty of Housepower. Unless they were aware of these programs and enthusiastic boosters for them, they could muff the biggest sales

"Housewives" for the day were these Incandescent Supply salesmen at the mock-up cooking school and the audience voted on them for the "queen." Left to right they were Tom Garvey, George Neagle, Ray Schwendt, Harold Reisfelt, Len Haselen and Wally Barnes

Harold Reisfelt, voted the queen, received a toy blender from Marvin Jankelson as prize. All queen candidates got corsages

entire gang . . .

on LBE

opportunity the industry had ever dreamed up for them. Instead of drifting with the tide Jankelson acted.

He consulted with Bureau Manager Bert Reynolds and Jack Ross of PG and E, who is bureau executive committee chairman, and found them eager to help. He asked them to prepare a fast-moving, concise program. He would bring the audience to San Francisco for a one-day meeting. Everyone would give something toward his industry. Incandescent Supply provided the meeting room at the Sheraton-Palace, a lunch and a dinner that evening at the Concordia-Argonaut Club. The men would give a day of their time, one of their precious Saturdays, Sept. 22. PG and E and the bureau would stage the dramatized program.

To Jankelson's letter on Sept. 5, an entirely voluntary response was made by 70 men from the San Jose, Fresno, Sacramento, Redding, Oakland and San Francisco houses of Incandescent and there were 78 at the dinner and cocktail hour that evening. Reaction from the men was spontaneously and universally enthusiastic. They called it the "best meeting we ever had," said that "we learned more from this meeting than from any sales meeting." Jankelson insisted it was not a sales meeting. It was a meeting of mutual acquaintance—the sales force and the industry's selling program. Each man could see for himself how to use and profit by what he heard and saw.

A strict time schedule was adhered to by Ross and his performers. Ross followed Jankelson's brief explanation of why they had been asked to come in. He told briefly of the industry's promotional forces, the Edison Electric Institute, the PG and E and the Northern California Electrical Bureau. B. W. Reynolds of the bureau described its program for 1956-1957 and then told of the Certified Lighting program it is sponsoring and conducting, a program especially interesting to this company's commercial lighting business.

Walter Abraham described the Housepower and Certified Adequate Wiring program and the movie, *The Magic Link,* was shown. Walter Lind outlined the PG and E advertising program for the winter and its monthly themes. Dan Alexander followed with a description of the dealer cooperation activities in connection with each month's program and showed how the distributor salespeople could obtain a better share of the business created by active support and participation in such local dealer activities.

"It's Magic"

After the luncheon, during which Robert Haskell, a professional magician now on the PG and E promotional staff, entertained the group, the Live Better—*Electrically* program was presented by Walter Lind. The kinescope recording of the original TV broadcast was condensed to show the salespeople the national scope of the program.

To acquaint the group with the way in which the public is being told the story and thus presold for the dealers' and distributors' benefit, a typical presentation such as that made at the numerous cooking schools and county fairs by PG and E was given. The audience was asked to imagine themselves a roomful of housewives attending such a public gathering.

Marguerite Fenner then put on a demonstration of cooking on portable appliances such as her staff of home economists do throughout the year. She showed the versatility of several table cooking appliances. Following her show the movie, *Meet Mrs. Swenson,* was run.

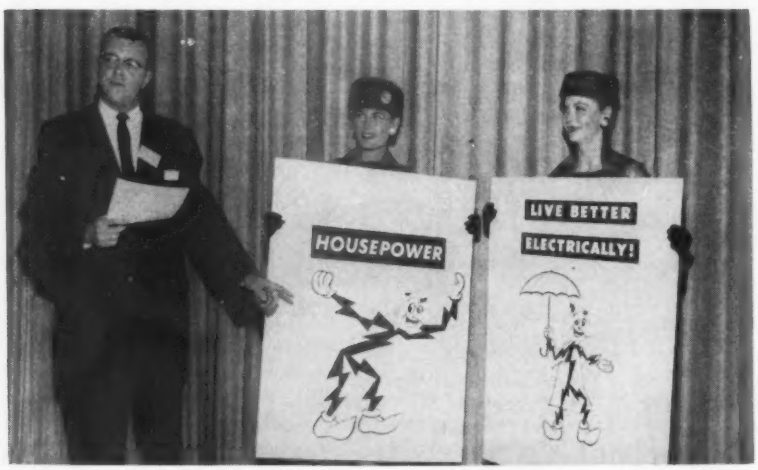
As a fitting and clever finale the Housepower story of adequate wiring was amusingly dramatized by Haskell using magic tricks in an ingenious way. It provided the most interesting and least painful way to tell an old and usually dull, though important, story.

Still in the spirit of a home economist demonstration six of the salesmen had been selected as candidates for "queen" for the day and had been voted upon at the luncheon. They were called to the stage to receive a toy appliance as a gift and the winner, Harold Reisfelt, a toy blender. All received corsages in the authentic cooking school manner.

Frank Falge, representing the Live Better—*Electrically* program, was present. He termed the entire affair the best, as well as the first, such joint activity between an electrical distributor and the utility in capitalizing upon the impact of the national advertising and promotion.

Dealers were enthusiastic when they learned of this program in which the major electric utilities of the area are working together for the over-all success of the industry.

Ralph J. Phillips, vice-president in charge of sales, San Diego G&E, Clark Chamberlain, bureau secretary-manager, William H. Anderson, assistant sales manager, Frigidaire, are pictured at left. Right: Ivan Lauritzen, retiring bureau president, with Ed Nystrom, incoming president, and M. F. Bennett, vice-president, RCA. All took part in San Diego bureau's program stressing . . .



Norman Foster, Barnes-Chase Agency, points out two themes in bureau-utility advertising

Panelists Frederic Rea, Western Appliances & TV, C. W. Leihy, Electrical West, Howard Emerson, Electrical Merchandising. Clark Chamberlain was moderator for the panel

Future Market Opportunities

Opportunities for market development in the future provided the core for the program of the annual fall conference of the Bureau of Home Appliances of San Diego. The large and attentive audience, comprised of leading dealers, contractors, distributors and utility people, first was given a preview of the 1956-57 advertising and promotional program which will back loadbuilding efforts in the San Diego metropolitan area. This program, which will be built around the Live Better—*Electrically* theme, will utilize much of the national promotional material and sales aides that have been prepared by NEMA, EEI and other industry groups. An excellent response from consumers was reported in the national "How's Your Housepower?" contest.

Two appliance manufacturing executives, M. F. Bennett, vice-president of RCA, from Camden, N.J., and William H. Anderson, assistant general sales manager of Frigidaire in Dayton, Ohio, described new appliance developments over the horizon which will vastly increase the opportunities for customer service and business expansion in the electrical area of the nation's economy. Such new devices as

supersonic clothes cleaners, irradiated food storage centers, mural color TV, and beds without covering were described by these speakers as being the normal accouterments of the home of tomorrow.

A panel composed of Howard Emerson, Western editor of *Electric Merchandising;* Frederic Rea of *Western Appliances & TV;* C. W. Leihy of ELECTRICAL WEST; and moderated by the bureau's manager, J. Clark Chamberlain, discussed the problems and opportunities of the present-day appliance retailer. On the two big problems of discounting and "built-ins," the panel discussion indicated that no quick or easy solutions could be anticipated. The impact of both problems, however, on the individual dealer can be diminished if local retailers can set up to capitalize on the huge home modernization market that is rapidly being developed through such activities as the Housepower program and the continued exposure of the modern housewife to up-to-date styling, color and arrangement.

The profit opportunities in better promotion of electric housewares are an important phase of over-all business success in the appliance field, according to the panelists. The ability to create volume from modest amounts of floor space, the impulse buying aspects that can capitalize on normal shopping traffic and the popularity of housewares as gifts were cited as reasons why alert merchandisers give electric housewares a prominent place in their business planning.

The annual fall conference was also the occasion of the inauguration of incoming officers of the bureau. This year E. W. Meise, San Diego Gas & Electric Co., the bureau's first president, presided over the installation of Ed Nystrom, Nystrom Brothers Co., as the new president of the bureau. He succeeded Ivan Lauritzen of the San Diego Junior College and Vocational School.

Top Honors Again

Bureau of Home Appliances of San Diego County won top honors at the 21st annual conference of the International Association of Electrical Leagues in Detroit. It was awarded a gold plaque as the league that had made the most outstanding contribution during the year to the industry's electrical housewares promotion.

This is the second successive year that the bureau has been so honored in this annual contest sponsored by NEMA. Clark Chamberlain, secretary-manager, received the award for the bureau.

Problems and opportunities alike were carefully weighed at a series of dealer meetings in the Far West. A traveling troupe of experts spoke at . . .

NARDA Profit Clinics

Nearly 1,000 appliance-TV dealers in the Far West took a close look at their immediate selling problems and a long look at their opportunities for the future at a series of meetings held during late September by local units and dealer organizations affiliated with the National Association of Appliance & Radio-TV Dealers.

The Appliance Merchandisers Assn. in Phoenix held a one-day "sales, service and management clinic and forum" on Sept. 27, beginning with an afternoon session held in the auditorium of Arizona Public Service. Guest speaker was M. F. Bennett, vice-president, RCA-Victor, Camden, N. J. Other speakers included Harold Witham, appliance-TV dealer from Bakersfield, Calif., and the group of four who spoke at each of the NARDA meetings—A. W. Bernsohn, managing director of NARDA; Don Gabbert, appliance-TV dealer in Minneapolis, Minn., and current president of NARDA; Frederick H. Hahn Jr., appliance merchandise manager, *Life* magazine; and Howard J. Emerson, West Coast editor, *Electrical Merchandising.*

All Color by 1963

Bennett told the group that he believed that by 1963 all TV transmission will be in color. He expects sales of TV sets to reach 9,000,000 for 1958, with most of the increase the result of color set sales. No letdown in sales of radios was seen by Bennett—he foresaw sales reaching 11,000,000 units by 1960. Hi-Fi should increase by 96% in sales of factory-assembled units during 1957. In the future, electronic research will build the dealer's industry and opportunity with such new items to sell as—audiovisual tape recorders for the home, electronic filming in home movie cameras, mural TV, etc.

In the evening, the AMA continued its program with a dinner dance at the Arizona Country Club. Featured speaker was Don Gabbert, president of NARDA. Gabbert discussed the planning and execution of successful dealer promotions, advising the dealers to develop regular promotions and to follow through with the idea—particularly by getting salesmen enthused.

In Bakersfield, Calif., on Sept. 23, the local NARDA group sponsored an afternoon and evening meeting to hear the talks by Gabbert, Hahn, Bernsohn and Emerson plus an address by Cliff Swanson, appliance-TV dealer from Hollywood, Calif., who spoke on "Competing in Today's Market." In the evening the program was devoted to a special session keyed to the appreciation of salesmen.

In Seattle, on Sept. 27, the Northwest Appliance & TV Assn. held its 4th Annual Profit Clinic at the Benjamin Franklin Hotel. Beginning with a breakfast meeting, the profit clinic continued through until late evening with 17 speakers or panelists.

Market Factors Eyed

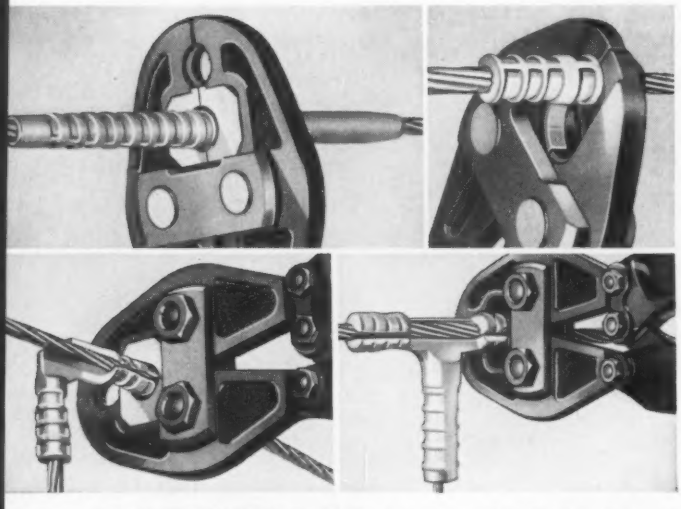
Featured at the morning meeting was "Factors in Today's Appliance and TV Market" as seen by Fred D. Ogilby, vice-president of marketing, Philco Corp., Philadelphia. Ogilby predicted that dealers will continue the trend toward specialization in the full lines of one or two manufacturers, and that the dealers will be broadening the type of products they carry in order to build traffic. On the same program *Life* magazine's Ted Hahn pointed out that the appliance-TV dealer must create a personality for his store and for his advertising so that he will create an identity apart from other dealers. He emphasized the necessity for a long-range plan for a dealer's progress, with the use of advertising on a steady basis that keeps the public's attention focused on the dealer at all times.

In the afternoon, the clinic heard the story of the NARDA Institute of Management from appliance-TV Dealer Aubrey Fletcher of Olympia, Wash., who attended the institute in August. Dave Van Winkle, national sales promotional manager, Hoffman Radio & TV Corp., Los Angeles, spoke on "How to Put on a Profitable Promotion." A dealer panel moderated by Bert Johnson of Graybar included Dick Finch, Medford, Ore.; Jack Mulhurn, Bellingham; Mike Wood, Auburn; and Don Gabbert.

SO VERSATILE . . . YOU'LL WANT

new Kearney

dies "snap in-snap out" with 2-finger ease and you get the *widest* compression fitting size range . . .



EXTRA SIZE RANGE! Fixed die in jaw nose installs Serv-Ens and L-Taps. Insert dies available to install sleeves and Squeezon fittings for most wire sizes used in distribution systems. Dies positioned close to fulcrum pins so minimum effort is needed on the tool handles. Wire cutter blades, also available, snap into same seat as the dies.

So convenient, versatile and low-cost . . . you'll want one on every line truck! Now you can make most distribution connections . . . install the *widest* range of sizes . . . with new Kearney 0-51 and 0-52 lever-action tools. "Snap in-snap out" interchangeable insert dies . . . a new Kearney *exclusive* . . . give you extra economy, speed, efficiency!

Lightweight, simple to operate . . . rugged and safe. Get yours now. Write today for Bulletin 13.

for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

The Mark of Quality

KEARNEY PRODUCTS

ONE ON EVERY LINE TRUCK!

exclusive O-51 O-52 tools

REALLY FAST, EASY DIE-CHANGING! No tools needed. Die halves are identical and self-aligning. "snap in-snap out" with 2-finger ease! Each die part locks in rectangular seat by a shoulder and groove, is held in place by spring locking pins — utmost rigidity in operation!

You can make the following connections with

KEARNEY O-51 AND O-52 TOOLS

SQUEEZONS—up to and including 4/0 ACSR, or stranded

L-TAPS—up to and including 2 ACSR, or stranded

T-TAPS—1/0 ACSR, or stranded

SERV-ENS—up to and including 1/0 ACSR, 4/0 stranded

SLEEVES—up to and including 4/0 stranded aluminum, 2/0 ACSR and stranded copper

JAMES R. KEARNEY CORPORATION

4224-42 Clayton Avenue, St. Louis 10, Missouri

***Canadian Plant:* Guelph, Ontario**

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, **Maydwell and Hartzell, inc.,**

Los Angeles • Seattle • Portland • San Francisco • Spokane • Phoenix

Now you need only half the former space with General Electric's new 30 amp, 600 volt HCI safety switch!

only 7⅜" wide

This HCI safety switch, both heavy and standard duty, has a new compact design measuring only 7⅜" wide x 9⅛" high x 5⅜" deep! In less than half the former space, you get the same dependable protection and these important benefits:

Long life, dependable performance. G-E arc quenchers quickly divide and snuff out arcs, help prevent pitting and burning of contacts. Heavy steel box has Bonderite† corrosion-resistant finish and butt-hinged door for rugged durability.

Speedy installation and maintenance. Front operated handle makes close ganging easy with the heavy duty model; front fusing on both models means fast access to fuses, efficient heat dispersal. Double-break HCI pole units can be individually replaced.

Better protection, greater safety. Quick-make, quick-break contacts can't be teased in or out. Switch handle locks OFF or ON. When switch door is open, special line shield on heavy duty model guards operator against accidental contact with live parts. *General Electric Company, Circuit Protective Devices Department, Plainville, Conn.*

Use these catalog numbers to order 30 amp, 600 volt HCI switches from your G-E Distributor:

Type H, heavy duty, front operated, 3 pole*		Type S, standard duty, side operated, 3 pole*	
Fusible	No fuse	Fusible	No fuse
TC90361SD	TC45361SD	TC60361	TC30361

†Parker Rust Proof Co. *UL listed

GENERAL ELECTRIC

French
Black Hills P&L

Patterson
PS of Colo.

Loiseau
PS of Colo.

Breslin
PP&L

53rd annual meeting of the Rocky Mountain Electrical League stresses . . .

Dangers of Federal Monopoly

Five of the ten speakers who comprised the thought-provoking program of the 53rd annual convention of the Rocky Mountain Electrical League held at the Broadmoor Hotel, Colorado Springs, Oct. 7-10, discussed aspects of attempts to create a federal power monopoly in the United States. Donald R. McClung, executive vice-president of Pacific Power & Light, told the convention that, even in the Northwest where the government has one of its largest power agencies, federal appropriations are far too slow to meet the growth requirements for power in that area. The people of the Northwest, he said, cannot wait for government action and have widely endorsed the partnership principle for that region's power development program, estimated to cost $3 billion in the next 10 years. Some thirty projects totaling about 7,500,000 kw and costing $2.3 billion are included in the future development plans of local power agencies in the area, acting either alone or under the partnership principle.

McClung also described a new 161-kv line from Billings, Mont., to Casper, Wyo., which will tie facilities in Wyoming, Colorado and western Nebraska to the Northwest Power Pool—thereby creating the equivalent of nearly 100,000 kw of capacity from the load diversity between the two areas.

Carl J. Forsberg, president of Wisconsin Power & Light Co., suggested that getting the story of free enterprise in the electric power industry across to the general public is equal in importance to the development of the atomic program for power purposes. In his address he differentiated between a public relations program, aimed at getting company recognition among customers in its service area; and a public information program, designed to tell the story of the whole electrical power industry and its relationship to the general welfare of the country.

Talking To Itself

Forsberg suggested that the industry is still "talking to itself" too much and suggested that management efforts be directed toward translating the industry's story into action news that could reach the public through newspapers and other similar media. He pointed out that once the people understand the issues involved, their innate fairness and deep-seated convictions about the advantages of free enterprise almost invariably win favor-

Hyer
So. Colo. Power

Kennedy
Okla. G&E

Dixon
Middle South Utilities

Corette
Montana Power

Thomas
PS of Colo.

Lagrone
Westinghouse

Wiley
City of Colo. Springs

Person
PS of Colo.

Wilson
So. Colo. Power

able opinion for the investor-owned philosophy.

Investors, too, are concerned with the continued threat of socialization of the power industry, according to John F. Childs, vice-president of the Irving Trust Co. Reasons for this investor concern were cited as (1) the industry is now 20% socialized, (2) the 1956 political campaign indicates that the Democrats still consider the electric power industry a political whipping boy, (3) the development of atomic power moves the threat of government competition into every area of the country, not just in the big river basins.

Childs said that a better understanding on the part of the customer is essential; that to provide good service at low rates is not enough to win public support. He pointed out that the monopolistic aspects of electric power supply make the job doubly difficult and that it is essential to convince the customer that he is fully protected from monopolistic practices by regulatory agencies.

Childs also said that the investors were concerned over the regulatory climate in many areas where commissions are overzealous in attempting to protect the customer. This could lead to inadequate future return on invested capital or a trend toward unbalanced capital structures if utility management is too timid to ask, and fight for, a fair rate of return.

Edgar H. Dixon, president of Middle South Utilities Inc., told the convention about progress being made by the investor-owned utilities in the nuclear power field. He pointed out that, even though there were 44 companies sponsoring projects which will total more than 1,000,000 kw of atomic capacity, there apparently is strong support in Congress for government owned and operated atomic electric power plants. He stated it was his opinion that, regardless of the outcome of the November election, strong efforts will be made in the next Congress to plunge the federal government deep into the business of generating power from the atom and that the success of these efforts would create another source of strong subsidized government competition.

While no one could say just how much nuclear power research would satisfy the proponents of accelerated government-sponsored nuclear research, Dixon described two important steps had been taken through EEI to accelerate the electrical industry's atomic program. The first of these was the formation of a technical appraisal task force on nuclear power whose fundamental duty will be to study and appraise the technical and economic factors and results to be achieved by the design and construction of prototype or full-scale atomic power reactors of various designs.

The second step was a conference of 150 utility executives of EEI companies held in New York on Sept. 19. The consensus expressed there appeared to be that there was an imperative need for further action by the industry to push atomic reactor development. Dixon expressed the belief that more reactors should be built by the industry but stated that all of them need not necessarily be of large size or new types. He suggested that more advanced reactor designs could be undertaken in a prototype size with electrical capacities of from 10,000 to 30,000 kw. Dixon stated that there is a tremendous job to be done, that more companies should participate in the development of the atom through actual reactor construction. Failure of the industry to demonstrate it can accept the full responsibility for peacetime atomic power development will surely result in the government moving in and creating a new subsidized, tax-free, "preferential" power empire.

Atomic Leadership

Adding to the information on the nation's atomic program, F. K. McCune, vice-president and general manager, Atomic Products Division, General Electric Co., affirmed the fact that the country is building a solid foundation of atomic leadership among nations and is keeping abreast of military advancement of the atom as a weapon.

J. E. Corette, president of the Montana Power Co., described what he considers the industry's first obligation to America as that of doing our job in such a way that private ownership, rewards for honest, intelligent enterprise and personal rights and liberties will be preserved for the present and future generations.

He challenged the politicians who are trying to win Congress to the cause of socialized power in America by using the term "give-away" by stating that these same politicians are actually using that term to mean

"take-away." Their success would take away the rights of American citizens to pay for and own their own property, to take away the freedom of choice in the matter of services and would take away property from the tax rolls, thus inflicting a constantly increasing burden on the individual taxpayer.

Corette stated, "We have before us a tooth-and-nail battle between socialism and our traditional American system of free enterprise—a battle between economic slavery and liberty. The prosperity, progress and entire welfare of the American people depend upon winning this battle on the side of free enterprise."

EEI's President Donald S. Kennedy, who is also president of the Oklahoma Gas & Electric Co., cited some of the accomplishments that have been achieved in this country through the voluntary cooperation of free individuals, free thinking and independent companies. He stated that standardization was one of the greatest steps ever taken to lay the proper foundation for economic progress and prosperity. Standardization, which has made possible our great productivity, came about through cooperative efforts of manufacturers, industrial committees, and groups of consumers and producers acting in concert voluntarily.

He cited the electric utility industry for its fine record of cooperation to reduce the cost of electric service and extend its applications. He also pointed out that the industry's willingness to pool both facilities and resources has resulted in tremendous benefits to the electric power customer. Pooling, for example, has resulted in great economy, far better service, a cheaper product, and now enables all systems to benefit from the latest advancemenents in new power production and transmission facilities by making possible the application of extremely large generating units, the low-cost power producers. These vast interconnected grids are not presided over by government officials or bureaus but are operated on a purely voluntary procedure.

Kennedy called for support of all four organizations, which represent the investor-owned companies nationally. While it has not been possible to combine the functions of EEI, the National Association of Electric Companies, the Public Information Program, and the Electric Companies' Advertising Program into one large organization, recent efforts have eliminated much duplication and overlapping of functions of these four groups, each of which performs a specific purpose in promoting the welfare and progress of the industry and the nation. He concluded by stating: "Dictators, either in government or in a communistic economy, can never accomplish what we here in America have accomplished in an atmosphere of freedom and where there is no hindrance on a free exchange of ideas. The things which America enjoys today never could have blossomed in a communistic or a restricted economy."

Deploring the lack of action on recommendations of the Hoover Commission, Charles D. Curran, consulting engineer, Washington, D. C., told the convention that not one of the 15 recommendations of that commission on water resources and power had been adopted by the government. That power and water resources are juicy pork barrel items and attractive political bait is best indicated by the fact that federal water resources activities are assigned to 25 principal agencies, located in six departments and to five independent organizations.

Curran cited case after case of waste, poor planning and excessive costs, which add up to mismanagement and inefficiency in handling water resources for the benefit of all. He recommended that there be established in the office of the President an independent water resources and power board to strengthen independent review facilities of the executive's office and to help them glean out agency proposals that are conflicting and uneconomical. He also called for the elimination of preference in the disposal of natural resources and asked for local participation in the planning, financing and operating of water resources development projects with the immediate and direct beneficiaries making substantial financial contributions to their development.

"Automation is America's newest and most challenging frontier." This was the statement of P. T. Lagrone, manager of electric utility sales for Westinghouse, who also told the electric utility industry that it was time to stop being a cheer leader for automation and instead become its quarterback.

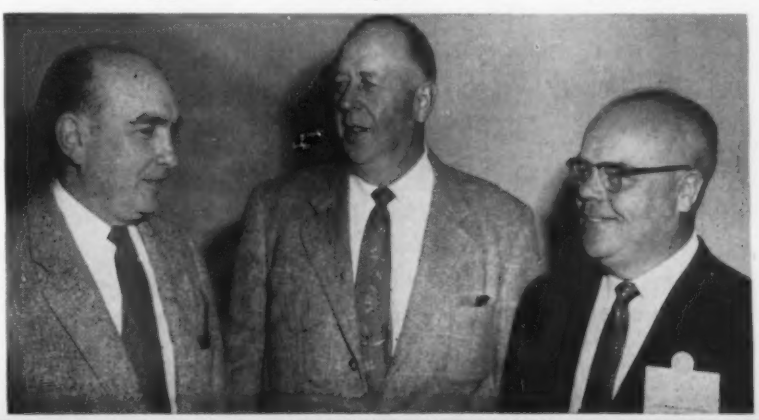
Lagrone stated that automation was the answer to survival and prosperity in the second half of the 20th century and that automation will bridge the gap between the tremendous productive demand of this country and the lack of labor that statistics indicate will plague the country during that period. The change to automated production will be gradual and natural but it must be continuous if this country is going to keep its leadership as an industrial producer.

Lagrone suggested that the electric utility industry had large responsibilities in connection with automation, primarily because automation

McCune, G-E — McClung, PP&L

Spangenberg, PS of Colo. — Hubbard, RMEL

Moody, A-C — Hitchcock, Graybar — Yetter, PS of Colo.



Subox makes fence painting easy and economical.

Subox paints are so simple and quick to apply that you can put them on by spray or roller coating methods — but for the fastest and most satisfactory results use an ordinary floor broom!

Subox paints are the only paints in America made with *suboxide of lead* — one of the most effective rust-inhibitive and anti-corrosive agents known. In addition, being a heavy colloidal pigment, it prevents spattering when applied to wire mesh. Subox goes on smoothly, evenly, thoroughly and adheres closely.

Next time use Subox. It costs no more than other paints and endures for many years. Comes in a wide variety of decorative colors.

Detailed instructions for easy, economical fence painting are contained in the booklet, *"Simplified Fence Painting"*. Send for a copy.

Subox Inc.

Established 1924

18 Fairmount Plant, Hackensack, N. J.

See Catalogues in Sweet's Industrial and Engineering Files.

not only builds load but represents dramatically the part electricity can play in American life. At present the problem seems to be not so much to sell the machinery of automation as to sell the idea and to explain its benefits patiently and ceaselessly to those who stand to gain most from it, the American people.

Industrial loads in the future will be large and numerous, according to S. J. Rosch, consulting engineer for Anaconda Wire & Cable Co. Rosch pointed out that the depletion of natural resources will require the creation of new materials through chemistry and that much of the huge quantities of materials needed for economy would, of necessity, be man-made. These processes not only will require large amounts of power but will inevitably lead to greater cooperation and coordination between all branches of engineering and science.

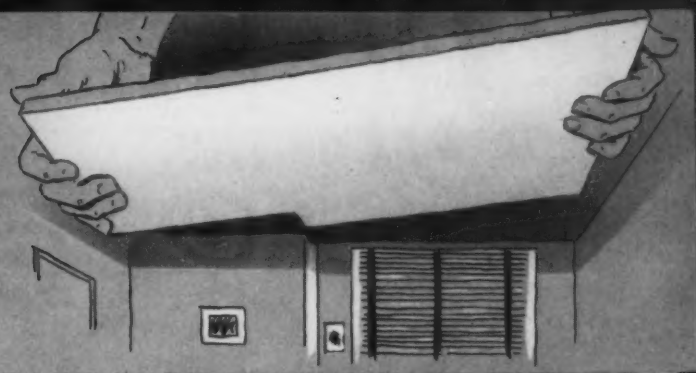
Prof. Charles E. Irwin of Michigan State University described the underlying qualities of successful management. These qualities, which are invariably found in successful executives, include faith in something bigger than the man himself, the courage of convictions, the capacity to keep an open mind, the ability to create new ideas and the ability to inspire others. In general, according to Professor Irvin, such qualities are communicated to others only by example but they must be present in the leader to provide the atmosphere of success, teamwork and progress.

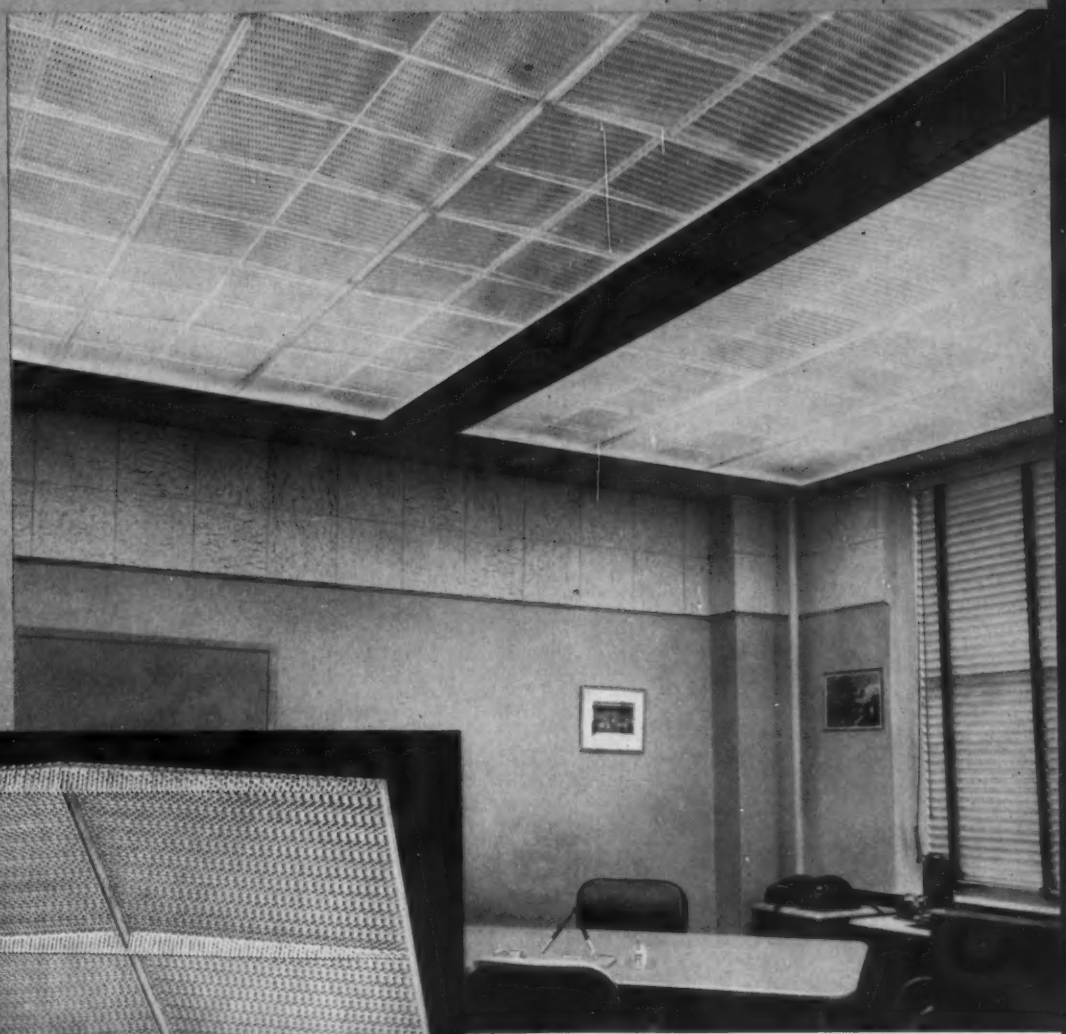
At the annual meeting of the league, Guy W. Thomas, Public Service Co. of Colorado, was elected to its presidency to succeed D. B. Hyer Jr., president of the Southern Colorado Power Co. of Pueblo. The new vice-presidents elected at the same meeting included J. E. Wilson, vice-president, Colorado Central Power Co.; Ken Eaton, district manager, Anaconda Wire & Cable Co.; and V. Hoover, general manager of the Pacific Power & Light Co. at Casper, Wyo.

The 53rd annual convention arrangements were made under the general chairmanship of R. T. Person, vice-president, Public Service Co. of Colorado, with the assistance of Donald T. Spangenberg, chairman of the program committee; J. J. Dobel, chairman of the sociability committee; J. E. Wilson, chairman of the entertainment committee; Don M. Hitchcock, chairman of the golf committee; Fred H. Wiley, chairman of local arrangements committee; with Bob Janke, Public Service Co. of Colorado, handling the publicity.

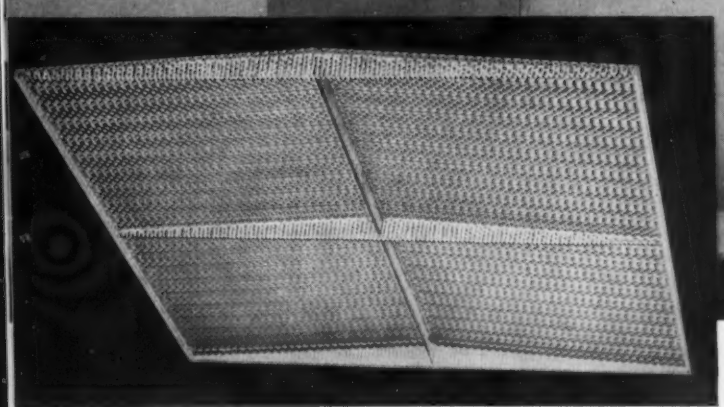
Holophane Engineers lifted the top off this room

and inserted the "sky" in the ceiling...





No. 6024
PRISMALUME*
CONTROLENS*
2-Foot Sq. (Approx.)



Whether for 2-foot-wide troffers of any length . . . or for large panels as shown above . . . the new HOLOPHANE No. 6024 PRISMALUME* is another tremendous step forward! . . . It produces maximum quantity of controlled light which provides complete visual comfort . . . Recommended for better fluorescent illumination of offices, showrooms, laboratories, stores, schools,—almost every form of modern installation...Write for detailed engineering data on this remarkable new Holophane development.

For Better Lighting Holophane *... Be Specific*

HOLOPHANE COMPANY, INC.

Lighting Authorities Since 1898

342 MADISON AVENUE, NEW YORK 17, N. Y.

THE HOLOPHANE CO., LTD., THE QUEENSWAY, TORONTO 14, ONT.

*Trademark

PANORAMA OF THE PCEA

Committee Appointments Announced

Organization of committee personnel for the current PCEA year has been completed and following is a list of men serving on the committees. Most of these groups already have held one or more meetings and are well under way on their year's activities.

Administrative Services Section

Guidance Committee—J. A. Talley, California Electric Power Co., Riverside, chairman; W. N. Fairlee, PG and E, San Francisco, vice-chairman; A. R. Cox, San Diego G&E; B. C. Meith, Calif. Elec. Power, Riverside; J. T. Montague, PG and E, San Francisco; H. E. Welsh, So. Calif. Ed., Los Angeles.

Advisory Committee—A. W. Althouse, So. Calif. Ed., Los Angeles; George Coughlan, PG and E. San Francisco; J. T. McNab, Arizona PS, Phoenix; F. W. Mielke Jr., PG and E, San Francisco; Dexter Stoner, PG and E, San Francisco.

Engineering-Operating Section

Guidance Committee—J. F. Sinnott, San Diego G&E, chairman; K. M. Bausch, Bechtel, San Francisco, vice-chairman; Larry Bartholomew, PG and E, San Francisco; G. R. Best, G-E, Los Angeles; R. C. Blankenburg, So. Calif. Ed., Los Angeles; W. E. Brown, Sierra Pacific Power, Reno; C. R. Canady, So. Calif. Ed., Los Angeles; Charles Croft, Square D, Los Angeles; R. L. Engel, Allis-Chalmers Mfg., Los Angeles; R. L. Franklin, Arizona PS, Phoenix; D. R. Hoopes, So. Nev. Power, Las Vegas; W. L. McCabe, Sierra Pacific Power, Reno; C. D. Mack, San Diego G&E; F. F. Mautz, PG and E, San Francisco; E. W. Morris, Westinghouse, Los Angeles; E. W. Palmrose, So. Calif. Ed., Los Angeles; H. J. Schomberg, Calif. Elec. Power, Riverside.

Advisory Committee—P. H. Adams, San Diego G&E, La Jolla; F. E. Bodine, Westinghouse, San Francisco; Alf Hansen, G-E, San Francisco; W. T. Johnson, Calif. Elec. Power, Riverside; J. A. Longley, Allis-Chalmers, San Francisco.

Business Development Section

Guidance Committee—D. S. Aiken, PG and E, Oakland, chairman; J. Clark Chamberlain, Bureau of Home Appliances, San Diego, vice-chairman; G. F. Black, Rome Cable, San Francisco; J. C. Blair, G-E Lamp Division, Los Angeles; W. W. Bryan, G-E, Los Angeles; C. D. Buchanan, Fluorescent Fixtures of Calif., South San Francisco; W. L. Greer, PG and E, San Francisco; W. H. Gribble, Thermador Electrical Mfg., Oakland; K. L. Hampton, PG and E, Fresno; Paul H. Henrichs, So. Calif. Ed., Los Angeles; W. C. Hird, Westinghouse, Emeryville; Mary J. Kelly, Philco, San Francisco; C. L. Neible, So. Calif. Ed., Los Angeles; J. C. Porter, G-E, San Francisco; Clem E. Smoot Jr., Smoot-Holman, Inglewood; D. W. Struck, San Diego G&E; W. E. Vaughn Jr., Calif. Elec. Power, Riverside.

Advisory Committee—Jack Kiedaisch, Arizona PS, Phoenix; W. F. Chapman, San Diego G&E; J. A. Corlett, G-E, San Francisco; H. L. Moore, So. Calif. Ed., Los Angeles; V. C. Redman, PG and E, Fresno.

and Its Committees

Agricultural Electrification Committee—J. C. Porter, G-E, San Francisco, chairman; D. W. Struck, San Diego G&E, vice-chairman; J. A. Longley, Allis-Chalmers, San Francisco; James Lyon, Lyon Rural Electric, San Diego; F. C. Miramontes, PG and E, San Francisco; G. H. Sullivan, So. Calif. Ed., Los Angeles; Harry Weingarten, Westinghouse, San Francisco; R. R. Whittaker, Calif. Elec. Power, Riverside; Lee Wilhite, Wintroath Pumps, Alhambra.

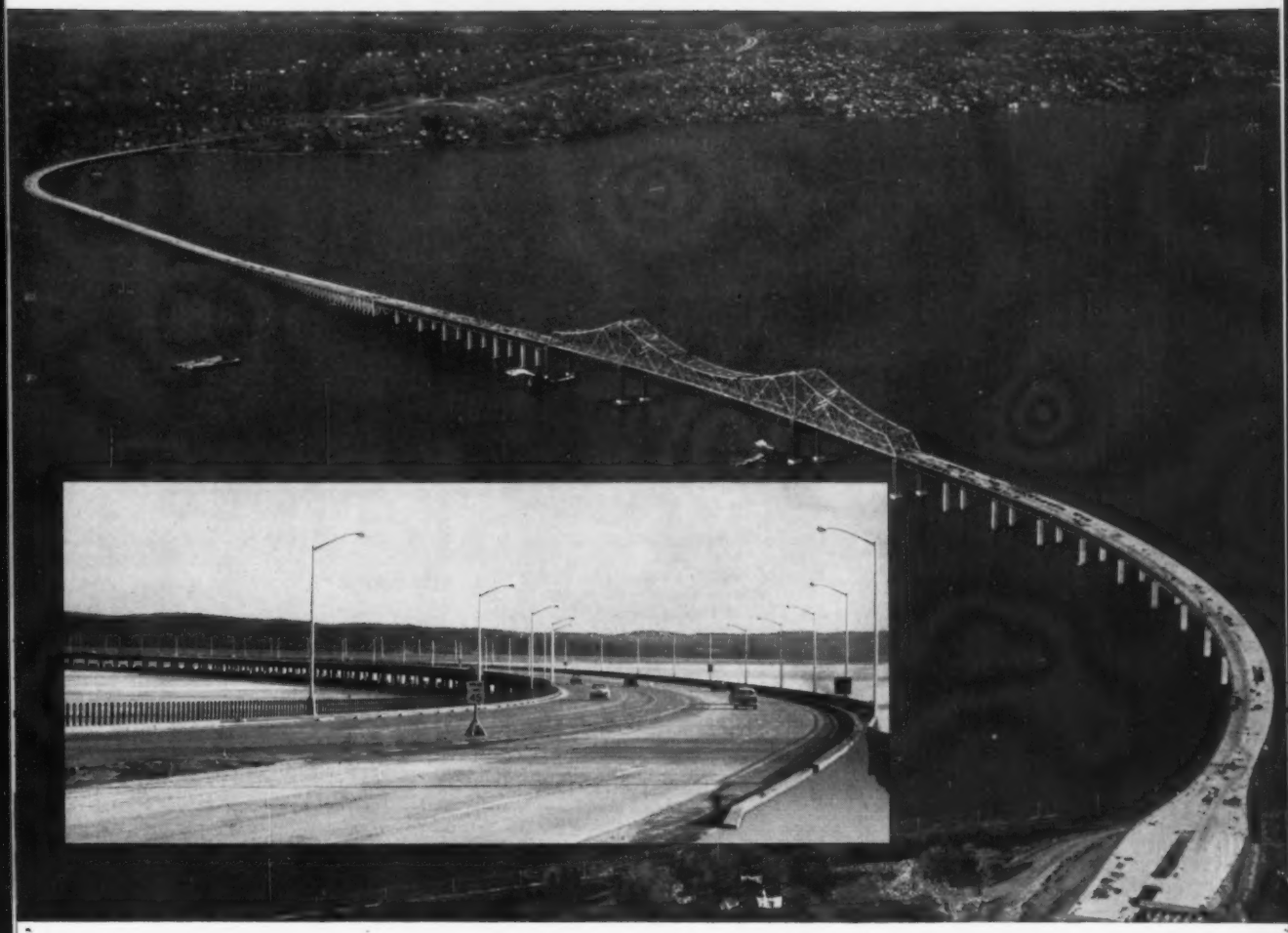
Heating and Air Conditioning Committee—K. L. Hampton, PG and E, Fresno, chairman; J. T. Bethell, So. Calif. Ed., San Bernardino, vice-chairman; J. C. Beckett, Wesix Electric Heater, San Francisco; H. W. Clingman, PG and E, Stockton; T. W. Fuller, PG and E, San Francisco; Fred Gabbard, Arizona PS, Phoenix; W. E. Hughes, So. Nev. Power, Las Vegas; Wayne Johnson, Schwartz & Lindheim, Oakland; Joseph T. Jones, Sierra Pacific Power, Reno; Frank W. Jordan, Westinghouse, San Francisco; Carroll E. Kiefer, Calif. Elec. Power, Riverside; E. W. Meise, San Diego G&E; W. D. Paulson, G-E, Los Angeles; J. W. Houghton, Westinghouse, Los Angeles; R. F. Page, Thermador, Los Angeles.

Home Economics Committee—Mary J. Kelly, Philco, San Francisco, chairman, Dorothy S. Huse, Sues, Young & Brown, Los Angeles, vice-chairman; Frances Alexander, Crosley & Bendix Home Appliances, San Francisco ; Erma Meeks Boyen, Hawaiian Electric, Honolulu; Betty Buettner, G-E, San Mateo; Evelyn R. Conant, So. Calif. Ed., Santa Monica; Betty Cook, Tucson GEL&P; Lorine Craft, Westinghouse Supply, Los Angeles; Hazel S. Dederman, G-E Supply, San Francisco; E. Pauline Eliker, So. Calif. Ed., Los Angeles; Marguerite Fenner, PG and E, San Francisco; Ethel Gage, Gough Industries, Los Angeles; Estelle Gaylord, Maytag West Coast, Oakland; Marjorie Helm, Calif. Elec. Power, Riverside; Nancy Johnson, Westinghouse, San Francisco; Ruth D. Kruger, Arizona PS, Phoenix; Mary K. Means, San Diego G&E; Pan Myers, Easy Washing Machine, Alhambra; Edna Poyner, Norge Sales, San Francisco; Clara Sherburne, Hotpoint, San Francisco; Betty Stalker, Maytag, Los Angeles; Crystal Strickler, So. Nev. Power, Las Vegas.

Commercial-Industrial Lighting Committee—Charles D. Buchanan, Fluorescent Fixtures, South San Francisco, chairman; Clem Smoot Jr., Smoot-Holman, Inglewood, vice-chairman; A. E. Ashcraft Jr., So. Calif. Ed., Los Angeles; G. M. Baker, Graybar Electric, San Francisco; Scott Beamer, consulting engineer, Oakland; H. R. Benike, Pyle-National, Los Angeles; F. E. Blair, Westinghouse Supply, Los Angeles; Walter J. Herz, Sierra Pacific Power, Reno; J. Roy Jones, Westinghouse Lamp Dept., Los Angeles; Frank B. Lee, G-E Lamp Div., Los Angeles; Fay J. Lemoge, Lemoge Electric, San Francisco; Stephen Lindheim, Schwartz & Lindheim, Oakland; William H. Ritter Jr., Calif. Elec. Power, Riverside; R. L. Sawyier Jr., PG and E, Oakland; C. M. Thompson, San Diego G&E; Robert H. Waddell, Sylvania Electric Products, Los Angeles; H. D. Weisser, G-E, Oakland; J. D. Whitnell, Arizona PS, Phoenix.

Home Lighting Committee—Willard C. Hird, Westinghouse, Emeryville, chairman; J. C. Blair, G-E Lamp Div., Los Angeles, vice-chairman; G. M. Baker, Graybar, San Francisco; Robert P. Burbank, So. Calif. Ed., Redondo Beach; G. F. Burgess, Calif. Elec. Power, Riverside; A. O. Grotenhuis, Moe Light Div., Thomas Industries, Los Angeles; Walter J. Herz, Sierra Pacific Power, Reno; Len Komar, Sylvania, Emeryville; W. E. Lind, PG and E, San Francisco; Alan J. McCutcheon Jr., Bureau of Home Appliances, San Diego; Leonard F. Milner, Lightrend, Los Angeles; W. D. Runswick, Prescolite Mfg., Berkeley; Les Waggoner, Arizona PS, Phoenix; Roy E. Bevan, Sylvania, Los Angeles; Maxwell Rosen, Incandescent Supply, Los Angeles.

Kitchen and Laundry Committee—C. L. Neibel, So. Calif. Ed., Los Angeles, chairman; M. V. Musy, Westinghouse, San Francisco, vice-chairman; W. H. Abraham, PG and E, San Francisco; Dan Alexander, PG and E, San Francisco; F. A. Baliman, Norris-Thermador, Los Angeles; T. L. Cruse, Calif. Elec. Power, Riverside; George Dickie, H. R. Basford, San Francisco; R. E. Fetzer, Tappan Stove, Los Angeles; E. M. Frellson, G-E Supply, Los Angeles; R. V. Hahn, Maytag, Los Angeles; J. T. Hairston, Philco, Los Angeles; Willard Hellman, Los Angeles; M. A. Hoff, Hotpoint, San Francisco; R. H. Kelly, Crosley-Bendix, San Francisco; Perry Knox, PG and E, San Mateo; A. P. Maser, Thompson Electric, Walnut Creek; William McConaha, G-E Supply, San Francisco; Gray Minor, Gray Minor Appliances, Oakland; L. H. Shaff, Arizona PS, Phoenix; R. T. Stevenson, So. Nev. Power, Las Vegas; J. E. St. Lawrence,



How HAPCO Poles cut maintenance on the New York Thruway...

When the New York Thruway planners specified HAPCO Aluminum alloy lighting standards for the Tappan Zee Bridge, they specified the end of pole painting maintenance. For this most concentrated over-the-water lighting installation in the world posed a major maintenance problem due to its exposure to great amounts of moisture.

Solving the problem with 220 HAPCO tapered Aluminum Poles and 35 special HAPCO Lighting Brackets for mounting on the middle span was a no-maintenance investment. That's because HAPCO Aluminum Poles and Brackets are corrosion resistant. They require no initial or maintenance painting. Maximum structural strength is assured because HAPCO Poles are spun from Aluminum Alloy and Heat-treated. Their silver grey beauty blends with the most modern surroundings, provides the highest visibility for maximum safety.

What's more, HAPCO Standards are designed to fit your individual requirements. Your Hubbard representative will be glad to assist you in specifying the HAPCO Pole that exactly fits your needs. And they're available from more than 300 leading electrical distributors throughout the United States.

Free HAPCO Catalog

If you'd like more details on design features and specifications of the complete Hapco line, write for catalog HAL 754. It contains valuable information to help you plan the most efficient, most beautiful highway and street lighting, as well as any other outdoor lighting requirement. (Hubbard Aluminum Products Company, 6301 Butler Street, Pittsburgh 1, Pa.)

HUBBARD ALUMINUM PRODUCTS COMPANY
Division of Hubbard & Company, Pittsburgh 1, Pa.

G-E, San Mateo; J. C. West, Easy Washing Machine, San Francisco.

Commercial-Industrial Wiring Committee—Paul H. Henrichs, So. Calif. Ed., Los Angeles, chairman; Gordon F. Black, Rome Cable, San Francisco, vice-chairman; J. H. Amann, Square D, San Francisco; C. D. Bronson, California Electric, Oakland; Garth A. Chamblin, California Elec. Construction, San Francisco; Frank B. Dickey, Anaconda Wire & Cable, San Francisco; Frank K. Duerst, Rome Cable, Los Angeles; Dane Egbert, Westinghouse Supply, San Francisco; F. J. Furnell, Pyle-National, Los Angeles; S. L. Hawken, Garnett Young & Co., San Francisco; Walter J. Herz, Sierra Pacific Power, Reno; Wayne H. Johnson, Schwartz & Lindheim, Oakland; Ulrich G. Karrer, PG and E, San Francisco; George Larsen, Larsen-Hogue Electric, Los Angeles; R. E. Larsen, Triangle Conduit & Cable, Los Angeles; W. M. McKenney, Phelps Dodge Copper Products, Los Angeles; H. E. McKinney, G-E Supply, San Francisco; P. L. Mullenbach, BullDog Electric Products, Los Angeles; William A. Somers, Jeffries Transformer, Los Angeles; R. E. Stone, National Electric Products, Los Angeles; A. W. Tracy, Anaconda, Los Angeles; J. D. Whitnell, Arizona PS, Phoenix; H. H. Zimmerman, Square D, Los Angeles.

Residential Wiring Committee—W. H. Gribble, Thermador, Oakland, chairman; W. W. Bryan, G-E, Los Angeles, vice-chairman; W. H. Abraham, PG and E, San Francisco; A. L. Berg, Los Angeles; E. L. Buttner, Scott-Buttner Electric, Oakland; R. M. Christensen, Norton Electric Wholesale Mart, Los Angeles; J. W. Enarson, So. Calif. Ed., Los Angeles; Lloyd W. Herrin, Los Angeles; Ernest G. Kramm, NECA, Oakland; R. E. Larsen, Triangle Conduit & Cable, Los Angeles; L. G. Maechtlen, Square D, Los Angeles; Frank M. Marriott, Calif. Elec. Power, San Bernardino; Charles R. Matthews, Westinghouse Supply, San Francisco; Alan J. McCutcheon Jr., Bureau of Home Appliances, San Diego; A. M. McMillan, Harvey Hubbell, Los Angeles; Lee Prince, Westinghouse Supply, Los Angeles; Norman Schiewe, G-E, San Francisco; Clyde Soden, Soden Wholesale Electric, Riverside; W. J. Varley, NECA, San Francisco; Les Waggoner, Arizona PS, Phoenix; C. O. Walther, Zinsco Electrical Products, Los Angeles.

4-H Club Electric Project Committee—Walter D. Howell, PG and E, San Francisco, chairman; J. W. Freeman, Calif. Elec. Power, Riverside; B. D. Johnson, PG and E, San Francisco; G. H. Sullivan, So. Calif. Ed., Los Angeles; W. C. Swinghamer, Westinghouse, San Francisco; D. L. Turner, San Diego G&E; W. L. Winter, Westinghouse, San Francisco.

Special Committees

Power Utilization Committee—W. L. Greer, PG and E, San Francisco, chairman; W. E. Vaughn Jr., Calif. Elec. Power, Riverside, vice-chairman; Walter G. Bayha, San Francisco; R. E. Bear, G-E, Los Angeles; G. L. Crow, G-E, San Francisco; Frank K. Duerst, Rome Cable, Los Angeles; Charles B. Farrow, San Francisco; Philip E. Gannon, San Francisco; G. E. Hersam, PG and E, Sacramento; Richard E. Kennon, Westinghouse, Los Angeles; Charles H. Krieger, San Francisco; Robert A. Lee, A. S. Schulman Electric, Los Angeles; L. L. Mattmann, Westinghouse, San Francisco; T. W. McCloskey, PG and E, Fresno; Kenward S. Oliphant, San Francisco; John R. Parker, So. Calif. Ed., Los Angeles; George B. Scheer, Kaiser Engineers, Oakland; D. W. Struck, San Diego G&E; Fred Talley, Sierra Pacific Power, Reno; Alfred R. Williamson, Arizona PS, Phoenix; E. W. Wismer, Wismer & Becker, Sacramento.

Accident Prevention Committee—W. E. Brown, Sierra Pacific Power, Reno, chairman; W. P. Bedgood, So. Nev. Power, Las Vegas; H. V. Chambers, Tucson GEL&P; W. L. Dyer, So. Calif. Ed., Los Angeles; C. W. Eddy, Calif. Elec. Power, Riverside; H. Heinrich, Hawaiian Elec., Honolulu; Warren S. Hyde, PG and E, San Francisco; R. E. McCann, So. Calif. Ed., Los Angeles; J. E. Smith, San Diego G&E; L. A. Smith, So. Calif. Ed., Los Angeles; R. W. White, PG and E, San Francisco; Carlton L. Yager, PG and E, San Francisco.

Code and Ordinance Committee—E. S. Dibble, G-E, Los Angeles, chairman; J. G. Foster, PG and E, San Francisco; R. E. Arbogast, Newbery Electric, Los Angeles; Mervyn A. Bader, building official, San Mateo; J. Warren Barry, Los Angeles; N. S. Beyer, Bussman Mfg., San Francisco; L. N. Bjerrum, So. Calif. Ed., Los Angeles; G. F. Black, Rome Cable, San Francisco; M. K. Bliss, Pacific Fire Rating Bureau, San Francisco; F. B. Breedlove, San Diego G&E; Charles Croft, Square D, Los Angeles; S. J. Johnson, Acme Steel, Los Angeles; E. G. Kramm, NECA, Oakland; L. E. La Fehr, electrical inspector, Alhambra; Martin Luskin, Federal Pacific Electric, Los Angeles; P. L. Mullenbach, BullDog, Los Angeles; Warren Penn, NECA, Los Angeles; C. J. Spain Jr., Westinghouse, San Francisco; R. E. Stone, National Electric Products, Los Angeles; F. E. Strauss, G-E, Oakland; A. C. Veit, electrical inspector, Los Angeles; R. J. Walker, Westinghouse, Los Angeles; C. O. Walther, Zinsco, Los Angeles; E. J. Weber, Emil J. Weber Electric, San Francisco; P. F. Wilson, electrical inspector, Santa Rosa; C. F. Wismer, electrical inspector, Santa Monica.

Highway Lighting Committee—H. F. Hartzell, Maydwell & Hartzell, San Francisco, chairman; H. G. Dillin, San Diego G&E; O. R. Doerr, PG and E, San Francisco; J. H. Mead, So. Calif. Ed.,. Los Angeles.

Technical Subcommittee of Highway Lighting Committee—G A. Trosper, PG and E, San Francisco, chairman; J. H. Burson, Westinghouse, San Francisco; Peter Garippa, G-E, San Francisco; H. F. Hall, So. Calif. Ed., Los Angeles; J. E. Hammond, PG and E, Fresno; G. S. Kimball, San Diego G&E; B. V. Kunde, Line Material, South San Francisco; L. W. Luley, Westinghouse, Los Angeles; A. L. Pryor, So. Calif. E., Los Angeles; E. L. Ralston Jr., Hawaiian Elec., Honolulu; Fred Swedenhjelm, Calif. Elec. Power, Riverside; L. W. Towner, G-E, Los Angeles.

Membership Committee—E. E. Whitworth, PG and E, San Francisco, northern chairman; C. Spence Purnell, Westinghouse, Los Angeles, southern chairman.

Representatives on Los Angeles City Ordinance Revision Committee—Marty W. Luskin, Federal Pacific Elec., Los Angeles; E. S. Dibble, G-E, Los Angeles, alternate.

Resolutions Committee—C. W. Leihy, ELECTRICAL WEST, San Francisco, chairman.

Committee on Problems and Responsibilities of Radio and TV Interference—R. L. Brinton, PG and E, San Francisco, chairman; P. H. Adams, San Diego G&E, La Jolla; D. R. Allsop, So. Nev. Power, Las Vegas; N. L. Clarine, So. Calif. Ed., Los Angeles; A B. Gilbertson, California-Pacific Utilities, San Francisco; William L. McCabe, Sierra Pacific Power, Reno; R. E. Marshall, Calif. Elec. Power, Riverside.

Quick Catch-up

American Power Dispatchers Assn. holds its national fall meeting Nov. 2-3 in Los Angeles. Sponsoring unit will be the Los Angeles Department of Water & Power. Two speakers will be heard on the Friday evening program at the 110 S. Boylston St. building of the department. Joe Canzoneri, Pacific Telephone Co., will discuss "Communication by Microwave and Radio Relay." Dr. R. Lindskog, University of Copenhagen, Denmark, will speak on "Atomic Energy in This New Era." On Saturday morning a tour of the dispatching office on Boylston Street and other such offices and substations in the area will be made. The directors meet Saturday afternoon and a social evening will conclude the affair.

NPPA

Power Use Section of the Northwest Public Power Assn. held its third annual workshop at Pasco, Oct. 25-26, with Jack R. Criswell, Franklin County PUD, Pasco, as chairman. Scheduled to speak were: Frank Falge, on the Live Better—*Electrically* program; Owen D. Hurd, Benton County PUD. relating experience with residential and commercial heat pumps and a panel discussion on adequate wiring led by C. W. Nash, director of load development, B. C. Power Commission, Victoria.

SRVEA

Snake River Valley Electrical Assn. will hold its annual conference during the first week in December at Hotel Boise, Boise. Its regular directors meeting precedes it on Nov. 7. A special meeting of the directors was called to hear Frances Armin, director of education and promotion for the National Adequate Wiring Bureau, New York City, in October.

IES

Puget Sound Section, Illuminating Engineering Society, heard Brooks Chassaing, sales manager, Art Metal Co., St. Louis, at its Oct. 2 meeting in Seattle. His subject, "The benefits of IES membership—Let's talk lighting, not fixtures."

San Diego Chapter heard J. C. Blair, residential lighting specialist of G-E Lamp Division, at a ladies night program and installation of officers, for its Oct. 4 meeting.

Westinghouse equipment that helps balance cost of voltage regulation with quality of service

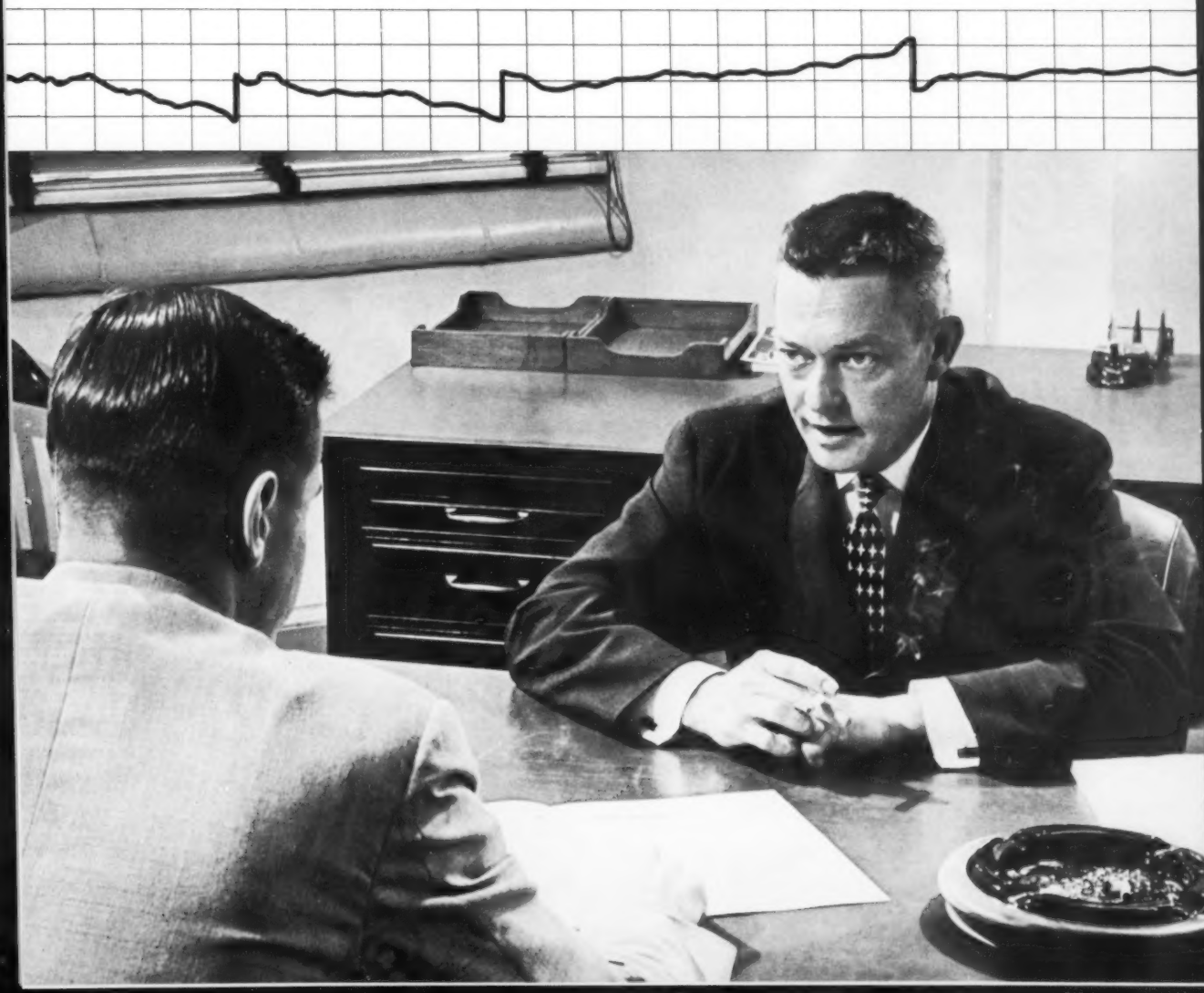
Mr. J. K. Dillard, Manager, Electric Utility Engineering, discusses System Voltage Control:

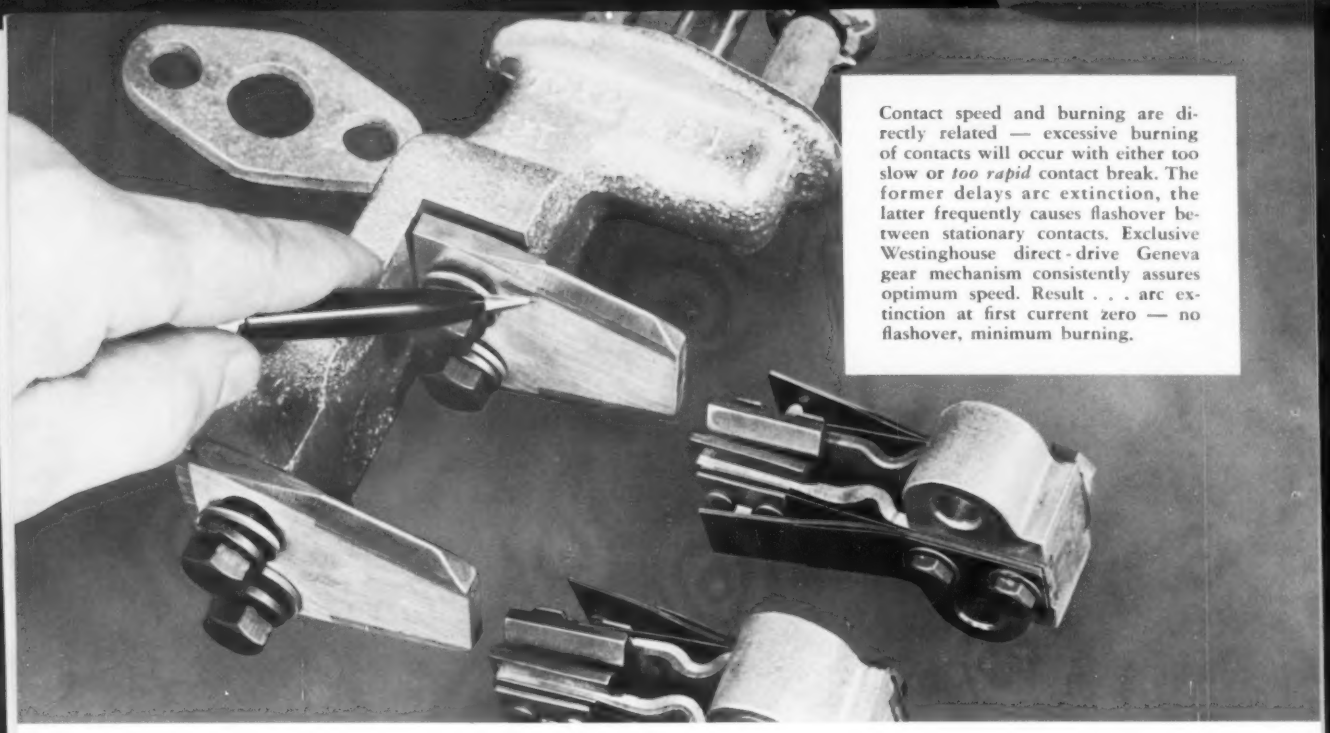
"The Utility Power System is cost sensitive to voltage regulation, a vital factor in quality of service. Westinghouse engineers are continually at work on new ideas and equipment to help solve your voltage regulation problems.

"The following pages show the broad selection of Westinghouse products that make it possible for you to achieve new degrees of voltage control."

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***





Contact speed and burning are directly related — excessive burning of contacts will occur with either too slow or *too rapid* contact break. The former delays arc extinction, the latter frequently causes flashover between stationary contacts. Exclusive Westinghouse direct-drive Geneva gear mechanism consistently assures optimum speed. Result . . . arc extinction at first current zero — no flashover, minimum burning.

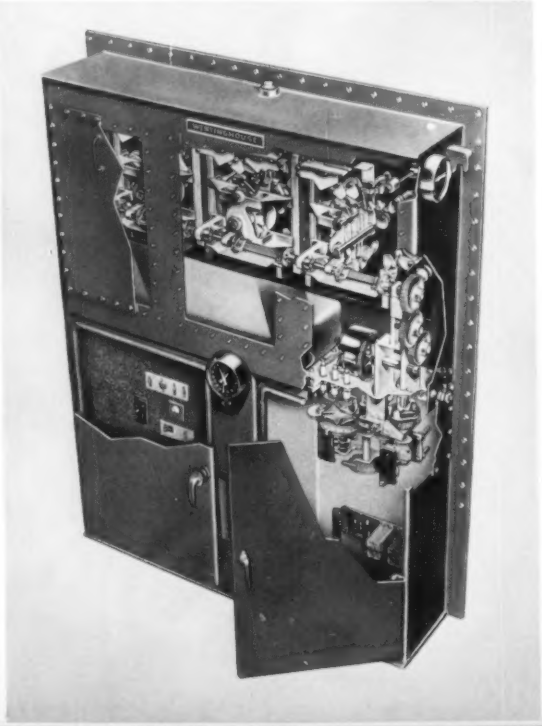
Westinghouse announces 20-year contact life warranty

For URS tap-changing mechanism . . . regardless of number of operations

Field inspections of scores of URS tap-changing mechanisms, in service 8 years or more, show negligible contact wear and burning. Based on this proved performance, Westinghouse now offers a 20-year prorated warranty on contact life — *regardless of number of operations!*

Load tap changers are direct drive; Geneva gear action assures optimum speed of moving contacts to prevent burning. This consistently controlled action is not possible with other types of drives. Geneva gear operation further provides shockless acceleration and deceleration . . . tested to 8 million operations with no appreciable wear.

Result . . . highly accurate regulation, a minimum of operating headaches.



Cutaway of URS operating mechanism reveals industry's only direct-drive load tap changing — positive, consistent, reliable action — backbone of new 20-year prorated life warranty.

New concept in precise voltage regulation

MAGAMP CONTROL

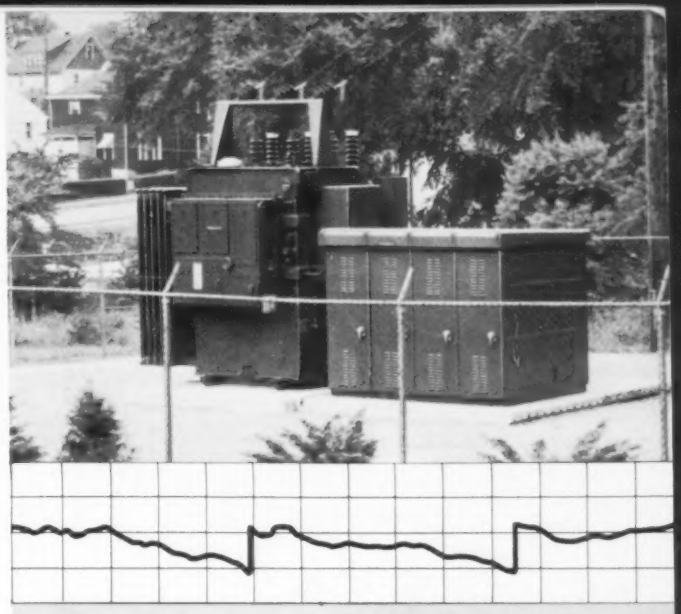
for URS and URT step regulators

Remarkable new MAGAMP* (magnetic amplifier) now standard for URS and URT load tap-changing equipment for both station step regulators and power transformers. MAGAMP sets a new mark in economy of operation. A static, completely sealed sensing device in the Type MS voltage-regulating control, MAGAMP has no moving parts, no need for mechanical adjustments, no maintenance. All settings — band width, balance voltage, line-drop compensation — are made electrically.

The principle of MAGAMP also serves the T.M. time-delay control. One setting integrates time delay for both "raise" and "lower", adjustable in a 5 to 90-second range. Resetting is automatic. In this completely static timing circuit, there is nothing to maintain, nothing to wear out. Relays actuated by this time-delay control have a proved life of more than 25 million operations.

Maintenance-free MAGAMP and unmatched *Geneva gear tap changing* — two of the soundest reasons there are for making this outstanding equipment your next investment in voltage regulation.

*Trade-Mark

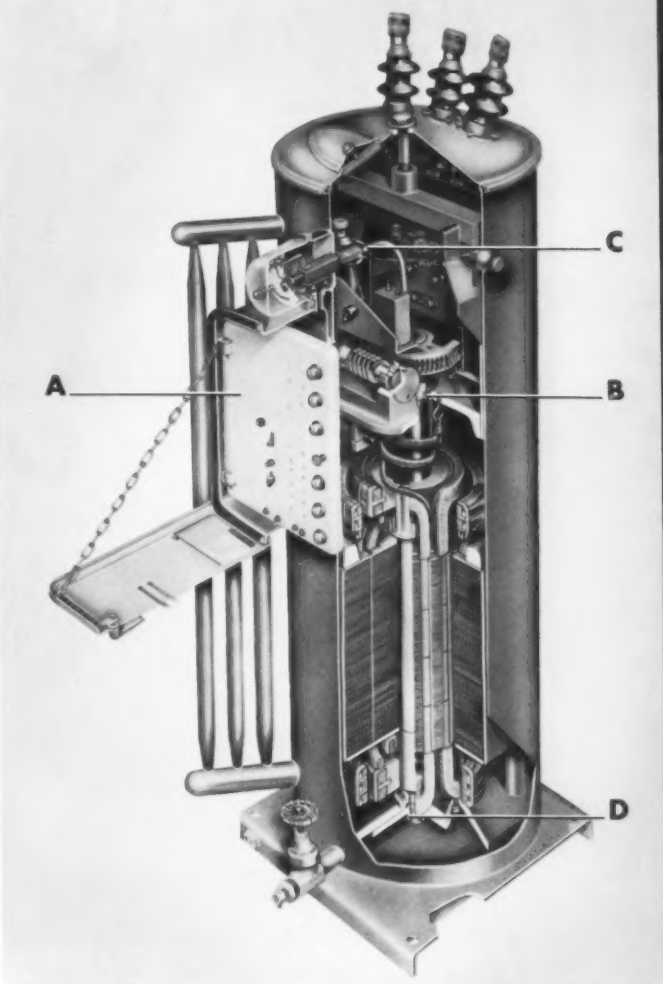


SU INDUCTION REGULATOR

with new 100% compounding MAGAMP gives you *set-it-forget-it* regulation

Two new and exclusive features make the Westinghouse SU regulator a more-than-ever reliable, precise, yet economical voltage control. First, MAGAMP for voltage sensing and motor operation delivers instant pinpoint accuracy. Completely sealed and static, MAGAMP has no moving parts to wear, foul or, consequently, to maintain.

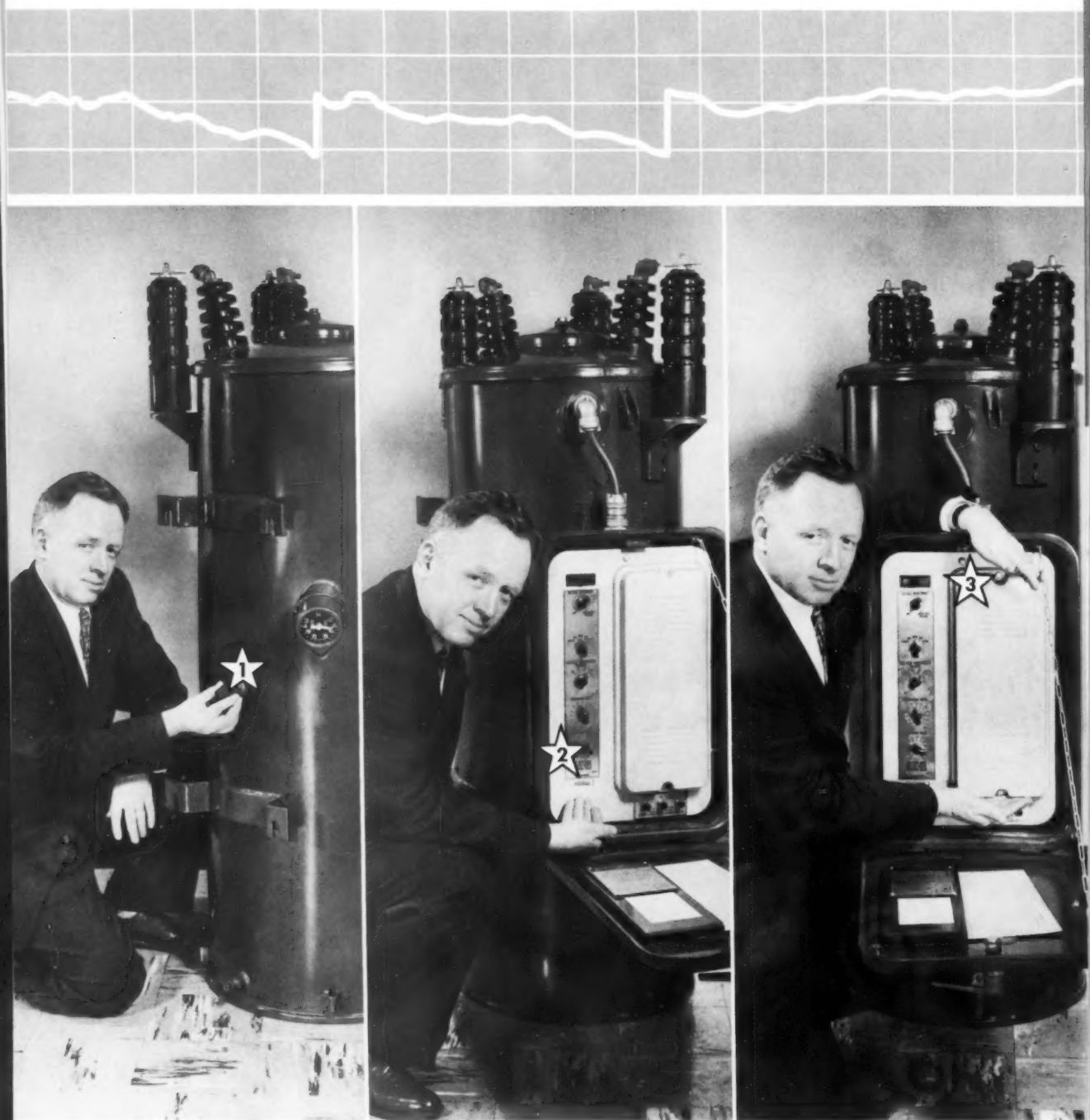
Second, the SU with new 100% compounding returns voltage exactly to set balance level on each correction, thus achieves the narrowest band width — plus and minus a half volt — of any regulator available. The pay-off for you: More revenue dollars through higher effective voltage level.



A. Maintenance-free MAGAMP control eliminates all contacts and moving parts. B. Upper bracket and worm gear housing integral castings of nodular iron assure high strength and permanent alignment. C. Swaged adapter assures permanent connection of position indicator drive. D. Permanently preloaded bearings.

WATCH WESTINGHOUSE *WHERE* ***BIG*** *THINGS ARE HAPPENING FOR* ***YOU!***

To improve quality of service with the new Westinghouse URL-16 step regulator . . .



Speed and versatility of the new CVR Westinghouse relay will give you the best obtainable regulation. While pickup or drop of heavy loads can be compensated for quickly — as much as 10 volts in 4 seconds — the relay can be adjusted easily to longer time delays for full range in a 10 to 90-second period for more gradual changes. Above, the URL-16 — (1) exclusive tap-changer compartment drain; (2) simplified control panel with operation counter which aids in keeping accurate operating records; (3) new CVR relay mounts quickly and easily for interchangeability with all previous URL-16 relays.

Unique CVR relay continuously monitors voltage fluctuations, corrects faster

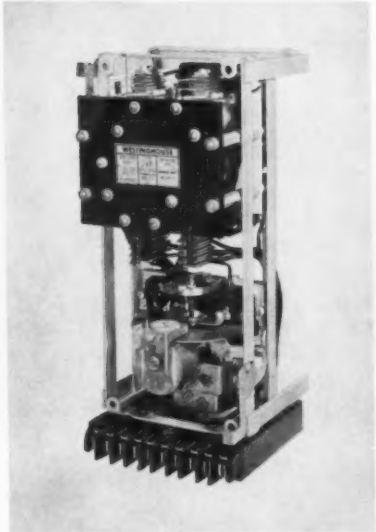
Key to the new performance standards of the URL-16 is the exclusive induction disc CVR relay which actually evaluates the need for speed of voltage correction. The CVR integrates two quantities — voltage and time. (1) It detects rate of voltage change, and (2) it responds with a speed proportional to the rate of change. Sudden or severe line drop — rapid response; slow change — slow response. The greater the need for voltage correction, the faster the relay acts to correct. This double action, combined with a new, faster tap-changer response (full buck to full boost in 13 seconds) gives you precision correction you cannot buy in any other regulator.

Another feature of Westinghouse regulators is the location of tap changer in a separate compartment. This eliminates contamination of transformer oil, fouling of core and coils, and possible flashover faults or overheating. Tap-changer oil is drained separately.

The concept of 1¼% step regulation now takes on new significance as a revenue builder. You can hold to preselected band widths faster, more closely, and more effectively improve voltage level. You get better regulation with less field servicing in the new Westinghouse URL-16.

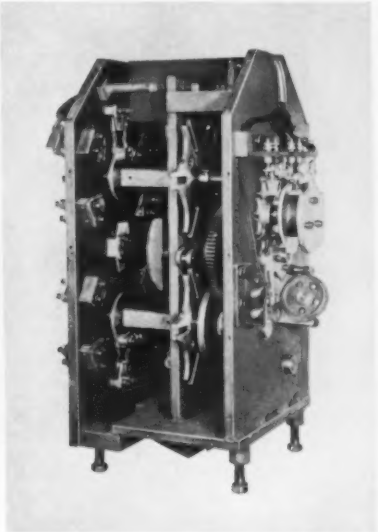
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU**!*

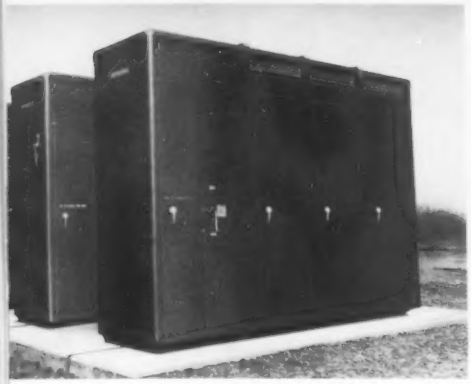


The only settings to be made on the CVR relay are the band width and time delay desired. Full interchangeability with all previous relays used in the URL-16 simplifies field service.

Unit assembly of tap changer and core-coil for greater strength and rigidity. Note separate compartment for tap changer — prevents carbon deposits from entering core and coils.

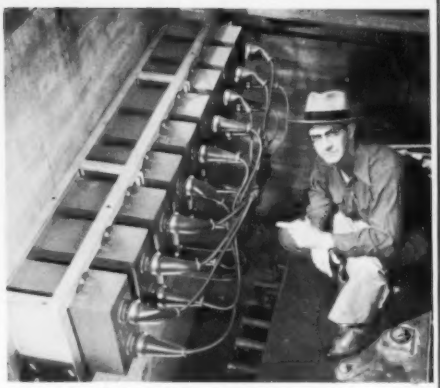


Exclusive Westinghouse direct-drive Geneva gear has no fixed time delay — operates instantly on signal from CVR relay . . . regulator can traverse full buck to full boost in 13 seconds.



Metal-enclosed equipments for substation application assure protection of apparatus and safety of personnel in congested areas.

Westinghouse Autotrol* automatically switched capacitors are factory assembled and connected, ready to install on the pole.



Specially designed Westinghouse capacitors provide quick, economical solutions to the headaches of overloaded networks.

KILOVARS . . .

You'll need one for every two kw added

Westinghouse capacitors are your most effective, low-cost source

A survey of several major power systems, made just a few months ago, estimates that one kilovar of capacitors should be added for every two additional kw of load . . . yet, already, problem areas on many systems are proving these estimates conservative. The wide range of Westinghouse capacitor designs and the broad experience of Westinghouse engineers can help you add kilovars where they will be the most effective, at lowest per-kvar cost.

Westinghouse capacitors offer real economy . . .

. . . because the basic unit in all Westinghouse capacitor equipments is not affected by climate or temperature extremes.

. . . because Westinghouse equipment is available in laborsaving, factory-assembled units for any type of installation — indoor, outdoor, pole-mounted, underground, in stacks, switched or fixed — for all applications from individual motor to large substation banks.

. . . because standardized racks and enclosures simplify installation.

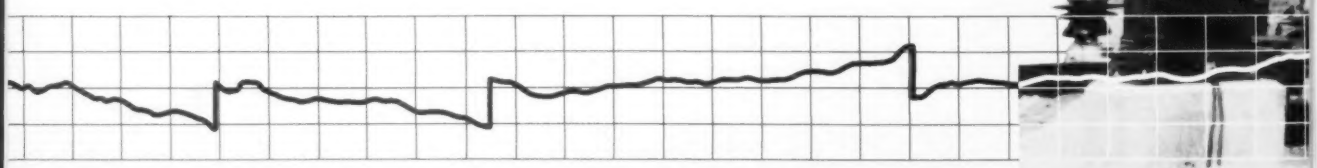
. . . and because continuous improvement in design and manufacturing techniques through a 36-year service record have kept Westinghouse ahead in capacitor development.

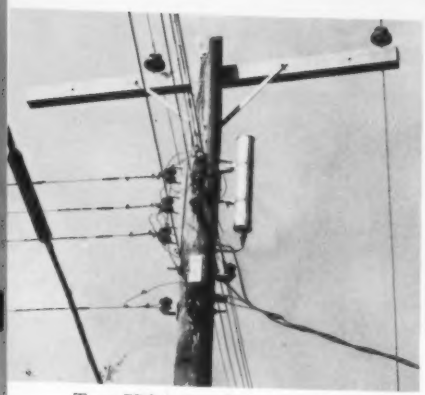
The exceptional breadth of experience by Westinghouse engineers in all phases of power factor correction and voltage control is the final and unequaled asset . . . always available to work with you and your consultants.

*Trade-Mark

WATCH WESTINGHOUSE!

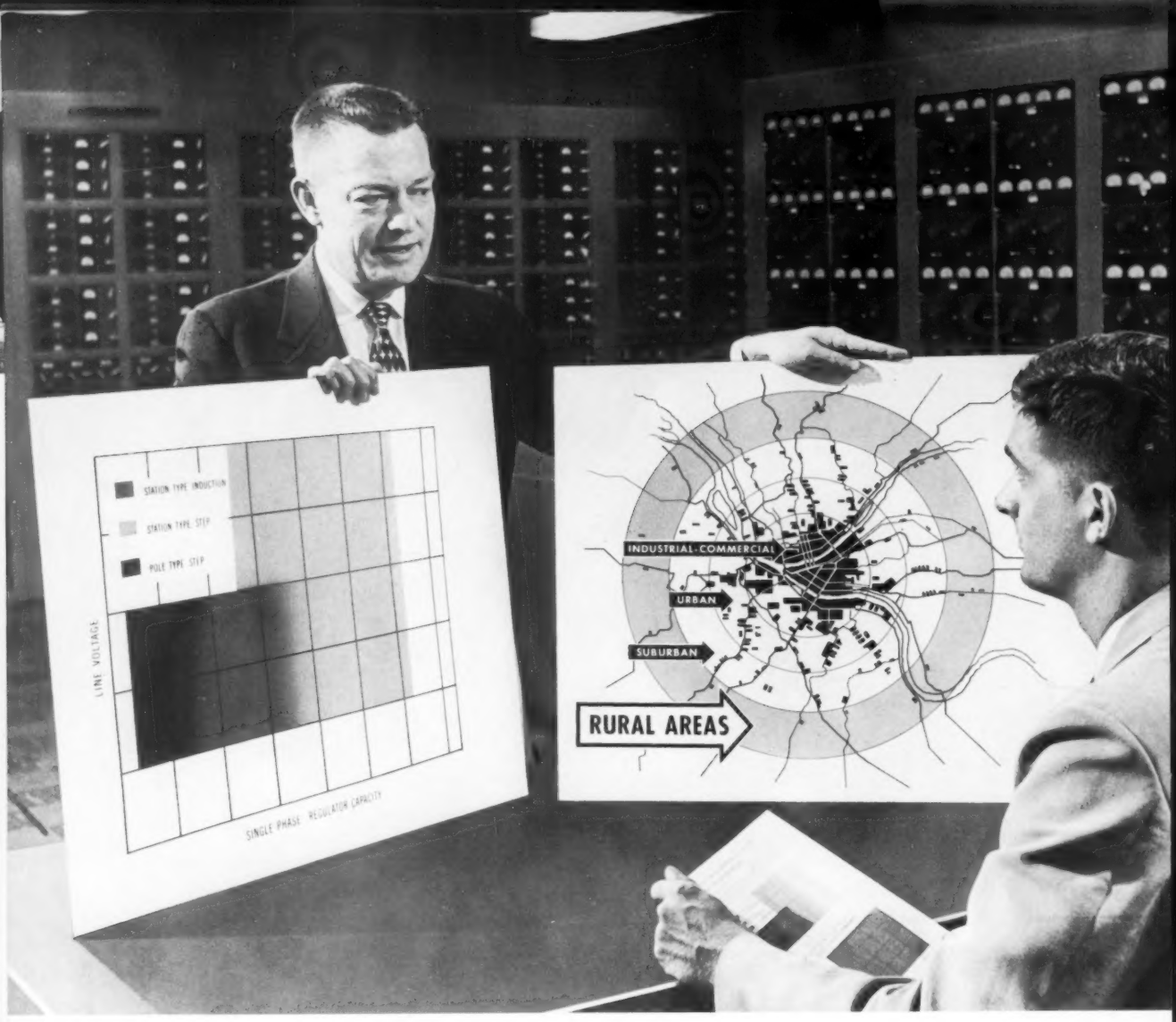
*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***





Type FPS 3, 5 and 7½-kvar distribution capacitors meet the growing needs for supplying kilovars to residential feeders.

A stack-type capacitor installation, like this, consisting of 1005 units supplies 25,125 kvar to offset exceptional I^2X losses on long, peak-load, high-voltage circuits.



More effective voltage regulation per dollar starts with

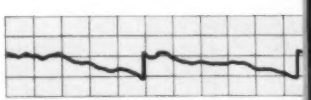
Westinghouse System Analysis and Application Engineering

The trend of modern power systems is well defined. In all directions the signs read "MORE LOAD."

Problems of maintaining proper voltage for both new and established areas are never further away than the following second . . . or the next inch on the system. The answers to proper voltage control depend upon the type of load served, its density, the location of bulk power supplies . . . in short, characteristics of your own particular power system.

In cooperation with your engineers and consultants, Westinghouse can assist with a complete or partial system analysis — the basis for sound equipment recommendations. It's just the kind of assistance that can help you achieve an economical, balanced equipment program, and consistently optimum revenue.

Call your Westinghouse sales engineer for assistance from Westinghouse electric utility engineers, the most experienced in the industry today.



WATCH WESTINGHOUSE *WHERE* ***BIG*** *THINGS ARE HAPPENING FOR* ***YOU!***

CP-1037

Sales and service were discussed by NAED at Phoenix. In analyzing distribution problems in face of record production, the theme was . . .

"Let's Talk Business"

Supplies distributors must continue to sell the importance of their function to the electrical industry, but they must at the same time pay close attention to how well they are performing their function, according to a concensus of the major speeches at the Western Region Convention of the National Association of Electrical Distributors at Phoenix, Oct. 1, 2 and 3.

"Let's talk business . . ." keynoted the program of the annual convention which brought 601 distributors, their wives and industry guests to the Westwood Ho Hotel for three days of serious analysis of how well the distributor is maintaining his position functionally and profitably in an era witnessing an all-time record in the production and movement of electrical goods.

W. B. Meek, Wesco, Los Angeles, and vice-president, Western Region, NAED, opened the series of major speeches with the keynoting "Let's Talk Business . . . Western Style." He combined an analysis of the present and future growth potential of the Far West with insight to position and the responsibility of the electric supplies distributor in this expanding market. The economic factors involved in this area expansion, particularly the problems of getting sufficient investment capital, were covered by the next speaker, Carl A. Bimson, president, Valley National Bank, Phoenix.

"Why Keep It a Secret?" asked N. J. MacDonald, president of Thomas & Betts Co., Elizabeth, N. J., in the closing speech of the first day's session. In a frank and penetrating analysis of manufacturer-distributor relationships, McDonald pointed to the necessity of the distributor basing his future as a full-functioning distributor. In particular, he referred to the trend toward manufacturers assuming warehouse and service facilities of distributors at local level, and the results of distributors making use of such facilities and services in place of their own operation.

An innovation in NAED programming was tried on opening day when the traditional Commodity Committee Reports were presented at an open meeting to which manufacturers and manufacturers' agents were invited to hear papers presented by Stanley M. Johns, Electric Corp. of Los Angeles, and by James B. Hartwig, North Coast Electric Co., Seattle. Johns explored the future of the supplies distributor in the sale of engineered products, particularly panelboards and switchboards. Following basic changes in the industry's approach to the marketing of these goods—particularly the need for standardization and for a discount structure that compensates for warehousing and service—Johns saw a future for the distributor who would: (1) train his organization to handle engineered products; (2) show manufacturers that he is qualified to handle them; (3) sell suppliers on economics of distributors handling the full details of this business; (4) urge contractors to value the qualified distributor's service on engineered products; (5) sell suppliers on using only distributors who qualified themselves for the full function.

Hartwig covered the subject of distributors selling commercial and industrial lighting equipment through specialized departments. He suggested a policy that includes the distributor (1) setting up a department staffed by lighting men; (2) picking lighting lines backed up by sound manufacturer policy; (3) carrying adequate stock to be able to handle most orders from warehouse; (4) setting a firm pricing policy that will compensate for the cost of specialized lighting service.

Members and guests here were presented on the second day with a report by NAED's executive director, Arthur W. Hooper. In analyzing the progress of electrical supplies of distribution, Hooper told of the need for more leadership by the responsible firms in the industry to help establish more sound policies for the industry. The individual distributor must exert more leadership within his own concern, too, said Hooper. The distributor must set up sound policies on price, credit, purchasing, etc., and communicate these policies to his entire organization. And the policy must be thoroughly explained to customers and suppliers as well, he said.

Charles H. Winship Jr., vice president, Phelps-Dodge Refining Corp., spoke to members and guests on conditions affecting the supply of copper to the market. He was followed by a presentation of NAED's slide film on the *Ten Steps to Better Distribution*. Commentary was handled by E. C. Phillips, program chairman, and W. B. Meek, regional vice-president.

A fascinating future for the electrical industry was envisioned before members and guests by S. J. Rosch, consulting cable engineer, Anaconda Wire & Cable Co., at the closing business session. In this fabulous future, Rosch foresaw the time when synthetics will be much more of a factor than today, when distributors will be selling mostly 250-v materials for house wiring, and when the selling of electrical materials suitable for use in the 500 C temperatures of nuclear reactors will not be unusual for the electrical supplies distributor.

Realistic evaluation of mutual problems of the distributor and the manufacturer is necessary, said H. L. Kramer, manager, agency and construction sales department, Westinghouse Electric Corp., in his address on "Distribution—An Added Measure of Value." He pointed out that as partners, the manufacturer and the distributor should look at the need for market coverage—he must insist on it—he must get volume somewhere, Kramer stated. The distributor can gear himself to give the manufacturer this market coverage and do it at a profit, he said, but the distributor's philosophy must be pointed toward the necessity of building the volume sales that the manufacturer needs.

The three-day meeting of the Western region members and guests included a cocktail party sponsored by manufacturers and representatives, the traditional golf tournament and a closing banquet and dance. A special luncheon for members, guests and their ladies was addressed by J. T. Kimball, vice-president and general manager of Idaho Power Co.

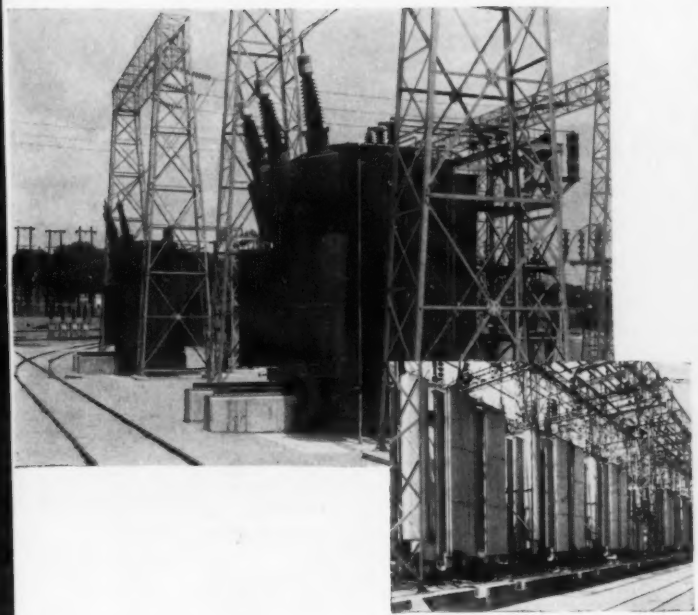
Sam W. Mesick, Los Angeles Wholesale Electric Co., was elected by the members to serve as vice-president of the Western Region of NAED for the coming year. General arrangements for the convention were chairmanned by J. T. Doughty, Phoenix Electric Supply Co., and the program was arranged by a committee under the chairmanship of E. C. Phillips, Coast Electric Co., San Diego, who presided at the meetings. Coordination was by W. M. Jewell, Western Region manager.

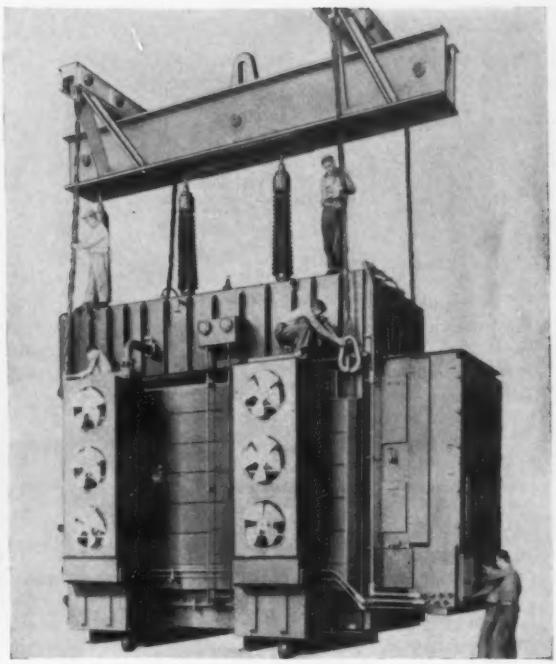
MOLONEY ELECTRIC

Power Transformers • Distribution Transformers • Load Tap Changing Transformers
Primary Unit Substations • Secondary Unit Substation Transformers
Subway Transformers • Industrial Dry Type Transformers

SALES OFFICES IN ALL PRINCIPAL CITIES

A NUMBER...





Any number that fits your needs . . . Kva that is, and Moloney can supply it. Regardless of the rating required, Moloney has the engineering experience, the facilities and the capacity to produce the transformers you need.

Of primary importance to utilities is the fact that Moloney Transformers in the field have unequalled operating records. Then too, Moloney engineering is recognized for the ability to solve problems that are unique to particular utility systems. This engineering ability and experience, functioning within the confines of the industry's finest facilities, leads to the production of transformers of any size and rating that are best suited to perform as specified. Add to this Moloney field-proved, revolutionary load tap changing equipment and you have the nucleus around which to build the best transmission and distribution installations.

ME56-26

MOLONEY ELECTRIC COMPANY

Regulating Transformers • Step Voltage Regulators
Network Transformers • Series Street Lighting Transformers
Capacitors • Transformers and Inductors for Electronics

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Howard Neighbor, Lou LaFehr; Harry Dobson receives honorary membership from IAEI President Larry Trim; SW Section's J. Ambrosi

SW Inspectors' Workshops Succeed

Tryout of a new method of conducting inspectors' annual meetings proved successful at the Southwestern Section, International Association of Electrical Inspectors, 33rd annual meeting at the Claremont Hotel, Berkeley, Sept. 17-19. President James Ambrosi, Oakland, fathered the experiment. The members universally liked it because it brought definite answers to many of their problems or brought to a focal point a recommendation for a future code change.

The essential difference was this: Instead of general meetings in which code changes are reviewed and long and involved hassels delay proceedings, three separate workshop conferences were held. One, under Barney Alverson, San Bernardino County, as chairman, dealt with the residential portions of the code. A second dealing with the commercial installations was chairmanned by C. M. Metzger, Long Beach city inspector, while a third on industrial installations was led by H. L. Gerber, consulting engineer, San Francisco, former inspector.

In each, the problems discussed were reduced to a recommendation for interpretation, then dictated to a stenographer, and on the final day these recommendations were read to the entire membership and voted upon.

The workshops were two-hour sessions and the classification of subjects was rotated in order to permit any attending inspector to be in on the discussion of a particular phase of any of the three groups of subjects. Thus wiring methods and conductors were considered at one session, grounding and services at another, overcurrent protection, branch circuits and demands at the third.

What was recommended is briefed in an accompanying box.

With such a forum for inspector problems, need for a code breakfast was minimized and only one was held on Tuesday morning with Chester Hefner as chairman. Among topics covered were the loading of the service vs the feeder where continuous loads are present; what wire to use for 100-amp services since No. 2 wire has only a 95-amp rating; and the new problem confronting all inspectors, grounding to the water system where plastic water pipe is used. Need for the revision of the National Electrical Code to recognize these changed conditions was expressed often.

General meetings were confined to the first morning opening business session and the final session on Wednesday. There were only three major speeches or presentations. An honorary life membership was presented to Harry V. Dobson, retired Santa Barbara inspector, by Larry Trim, Burbank chief inspector, who this year is IAEI president.

Presidents James Ambrosi of S.W. Section, Larry Trim of IAEI, Burbank inspector. In the background is Merwin Brandon

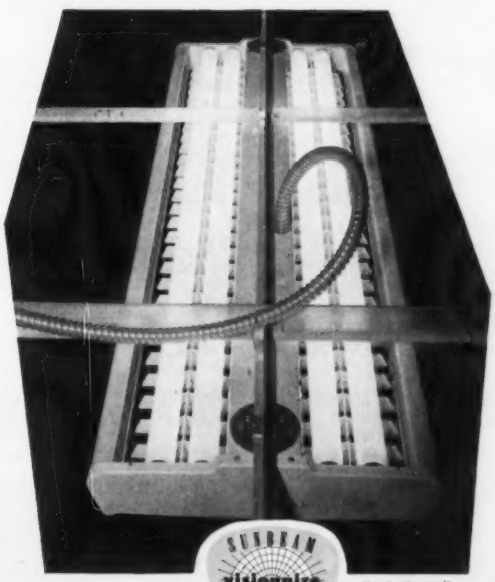
In his presidential address, Trim lauded the "unsung heroes," the chapter and section secretaries, who do so much of the work of the organization. He urged that in making proposals for changes in the code that these be supported by facts and reasoning in order to aid the code panels to see the problem as the inspector sees it. He also advocated an advisory board in the section to assist in a technical capacity city councils and commissions responsible for ordinances and codes.

President Ambrosi described the workshop program in his presidental talk, and was followed by Vice-president Barney Alverson, who described the details of how it would operate.

Victor G. Vaughn, Spencer Thermostat Division, in one of the three addresses at the meeting, discussed "Fundamental Factors Involved in Motor Branch Circuits," contending that requirements for disconnecting of both sides of the motor branch circuit through the control device was unnecessary for many reasons and that if total disconnection was necessary it should be at the main disconnecting switch.

At the Monday luncheon Curtis Welborn, president of Underwriters' Laboratories Inc., Chicago, was called

Flower Street Building, Los Angeles • Zamboni Bros., Electrical Contractors



*patent pending

CONTRACTORS for the lighting installation shown above were astounded to learn that these Sunbeam Visionaires® could be mounted and connected at the rate of about 6 minutes each — resulting in great savings in labor costs.

ARCHITECTS are delighted because for the first time they can plan for "surface" mounted lighting directly on suspended ceiling systems — with fixtures either parallel with or diagonal to the ceiling grid runners.

This new installation device **(CSM7)*** is the product of Sunbeam Lighting design ingenuity — planned with you in mind to increase the flexibility of fine Sunbeam Visionaires® and to help cut installation costs.

No tools are required — the hangers are simply clipped on the runners and remain in position as the fixtures are lifted for attachment. A few twists of the wing nuts hold fixtures in place. Before "cinching up," the fixtures may be slid along the runners to the exact location required. Ask you local Sunbeam lighting representative to demonstrate the new money saving **(CSM7)*** hanger.

SUNBEAM LIGHTING COMPANY

777 East 14th Place, Los Angeles 21, California

Shoot FOR ECONOMY AND TOP PERFORMANCE

Andersons' PISTOL GRIP

TYPE "PG" ALUMINUM DEAD END CLAMP

*** HIGH holding power!**

Ideal for long span distribution and sub-transmission.

A new quadrant type dead end clamp that more completely meets all the requirements for proper handling of aluminum and ACSR cable on distribution and sub-transmission systems!

- LIGHT WEIGHT . . . to reduce cable damage!
- HIGH STRENGTH . . . over and above ratings of cables and insulators normally used!*
- ONE-PIECE KEEPER ASSEMBLY . . . for quicker, simpler installation!
- FLARED MOUTH . . . to reduce chafing and vibration damage!
- CORROSION RESISTANCE . . . silicon bearing #356 aluminum alloy.

3 SIZES FOR COMPLETE RANGE . . . recommended for all-aluminum and ACSR cable. No liners required.

ADEQUATE WIRING SERVES AND SAVES

For more complete information consult your nearest ANDERSON representative

Industrial Engin. & Equip. Corp.
417 S. Hill St. — Michigan 7794
Los Angeles 13 California

Hamilton Associates
1236 Elati Street — CHerry 4-1505
Denver 4, Colorado

Muth-Richards Company
1804 Bush Pl. — CApitol 2128
Seattle , Washington

Waltham, DeWitt & Krusi
632 Monadnock Bldg. — GArfield 1-5054
San Francisco 5, California

Clarence W. Silver Company
550 West 7th So. — ELgin 5-5378
Salt Lake City 4, Utah

Muth-Richards Company
1231 N. W. Hoyt — BRoadway 2671
Portland 9, Oregon

Aluminum and Bronze **POWER CONNECTORS • CLAMPS • FITTINGS • ACCCESSORIES for SUBSTATION • TRANSMISSION • DISTRIBUTION**

ANDERSON ELECTRIC CORPORATION

P. O. DRAWER 2161 • BIRMINGHAM 1, ALABAMA

**Formerly Anderson Brass Works, Inc.*

Workshop Recommendations and Actions

Commercial Section

Recommended that the Southwestern Section prepare drawings that might be acceptable on a section-wide basis to interpret and clarify the question as to the gutter between the main disconnect and the individual switches.

That on larger bonding bushings, the connecting means are not large enough for the larger conductors.

That all switches should be designed to carry their full-rated current regardless of the types of fuses used. This was referred to UL for more study.

That requirements for service and feeder capacity for convenience outlets be added to the table now in the code relative to lighting.

Industrial Section

That the tables in Section 1119 on insulation resistance be referred back to the NECode committee for further study and possible revision. (Since none of the inspectors were enforcing the correction factors in Chap. 10, Table 1, no action was taken.) Manufacturers were asked to label conductors as to their over-all diameter, in order to indicate whether they are to be used for building raceway installation or underground or direct burial.

That the code clearly define lighting and appliance panel boards and differentiate them from power panel boards and switchboards, and also define the exception to the overcurrent requirement for lighting and power panel boards in switchboards.

Insistent need was expressed for more guidance in the code as to interrupting capacity although the group did not have anything concrete to recommend.

That the same requirements permitted on machine tools be allowed for other processing tools where motors are grouped and controlled from a single machine installation.

Recommended a study of maximum-size grounding conductors for grounding services and service raceways of unlimited capacities where unlimited fault currents might pass between the conduit, grounding conductor and the neutral.

Study should be given to see if No. 6 copper wire is sufficient for full protection of alternating current service in service equipment to grounding electrodes.

Residential Section

Recommended that two or more 20-amp branch circuits be provided for all receptacle outlets other than clocks in kitchen, laundry, pantry, dining room and breakfast room areas, as well as the outdoor living area.

That all separate household fixed cooking appliances have separate circuits and the specifications applying to range grounding be changed so that these are no longer exempt.

Recommended that when demand factors are used in residential wiring that overcurrent protection and disconnecting means be provided ahead of the distribution panel.

That wording be changed from weatherproof to raintight in Section 3732.

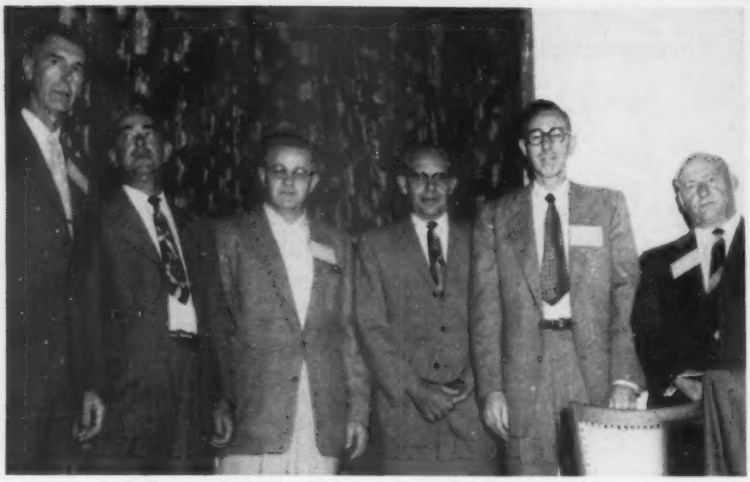
upon for an informal talk. He reported that the laboratories are catching up on their backlog of work and are now able to meet promised dates for the testing and listing of equipment. He also described the new facilities being built by Underwriters', among which are underground vaults for keeping the basic records in case of atomic attack.

Great interest was expressed in the carrier current remote control system explained by W. Lazorchick, sales manager, Time Equipment Division, and M. J. LaFaurie, sales engineer of International Business Machines Corp. An adaptation of the carrier current systems used for years by power companies to control remote stations, IBM has developed a system for imposing control impulses over a building's internal wiring system and through amplification and relays to control lights, valves, motors, or any equipment run by electricity. For civil defense purposes, an entire city could be alerted through the use of such a system.

A small four-channel transmitter is used. With it, some 60 control circuits can be energized at any 110-v outlet. The system codes the circuit; interlocking relays are used so that the signals cannot be simultaneously transmitted but are operated on a one-minute cycle. The company's own buildings make use of the system and a story on such an installation will soon appear here.

Another new thing in the matter of controls was described at the Wednesday morning session by C. J. Spain Jr., consulting and application engineer, Westinghouse Electric Corp. It was Cypak—a new control concept. Demand for higher relay performance has exceeded the ability of relays to produce, said Spain. By means of an ingenious combination of magnetic and conducting materials, this company has produced a device which performs all the functions of a relay without moving parts.

One of the three workshops, this one on commercial installation, conducted by C. M. Metzger, Long Beach chief inspector. Larger groups met on industrial and residential



Officers present and future: James Ambrosi, Lou LaFehr, Barney Alverson, Larry Trim, Frank Jones and Chester Hefner. Irving Sandorf, new vice-president, was not present

The devices are small in size and weight, have better speed of operation and reliability runs in hundreds of thousands of cycles rather than lesser quantities. The Cypak operates at very low power levels, so that it will operate from photocells without amplifiers. The device is blocked in a plastic casting and is free from corrosive influences. The Cypak cannot be interchanged with relays, one for one, but the system in its entirety can be substituted for a relay system.

Another general feature was a showing of color slides by Ed Muller and Z. R. Stanley, engineers in the California State Department of Industrial Safety, of faulty wiring installations. These had been found in their inspection work throughout industry in the state and were discussed as to their code violations and safety aspects.

An opportunity for the exhibitors, each in a brief space, to describe some of the new devices or services each offers was given at the final session in a novel new feature to such programs.

Charles L. Smith, secretary-treasurer, IAEI, Chicago, reported briefly on the activities of the national association and made a report on National Electrical Week for Sam Todd, vice-chairman of the program. National Electrical Week, he said, was started by Captain Sanislo in Seattle and has now been picked up by the entire electrical industry. Great effort will be made to publicize it next year. Electrical Week is the week of Thomas A. Edison's birthday in February and

M. J. LaFauri and W. Lazorchick of IBM were besieged with questions after telling of that company's new carrier current system to control any electrical equipment

Arthur Veit and E. E. Carleton, who are the section's executive council representatives

Smith urged all inspectors to take part in the industry's celebration of that time.

Everett Cogan, assistant technical secretary, IAEI, Chicago, spoke earlier about the membership and other IAEI activities and publications, and the availability of pamphlets on electrical safety in the home furnished by the electric cord committee.

Charles Foehn, business manager, IBEW Local 6, San Francisco, spoke of the inspector's need for a committee to work for higher wage rates for electrical inspectors.

In the election of officers, Frank Jones, Arizona Fire Rating Bureau, was elected president to succeed James L. Ambrosi of Oakland. Barney Alverson, San Bernardino, is first vice-president; Chester Hefner, San Mateo County inspector, second vice-president; and I. J. Sandorf, University of Nevada, Reno, third vice-president. Lou LaFehr was re-elected secretary-treasurer. On the executive committee, in addition to the officers, are Cecil Clark, Tucson, Ariz., inspector; Charles Pierce, Fresno inspector; E. Warren Small, Hawaii Rating Bureau, Honolulu; Mel Lundberg, Elko Lamoille Power Co., Elko; Ernest L. Nelson, San Leandro inspector; Lester Woldit, Sacramento city inspector; Art Vesco, San Diego inspector; H. K. Winterer, General Electric Co.; Leonard Johnson, T & B Co.; and W. A. Cyr, ELECTRICAL WEST.

On the executive council, E. E. Carleton, Division of Industrial Safety, was elected as was A. C. Veit, Los Angeles County inspector, with Barney Alverson as alternate. Attendance was 206 men and 48 women. The next annual meeting will be held in Arizona, possibly Phoenix, and because of the climate on Nov. 4, 5 and 6, 1957.

For a man who had the big responsibilty of general chairmanship of the conference thrust upon him on short notice, John R. Thompson, Berkeley inspector, with his committeemen managed the multiple details as though they were professionals and earned the warm praise of all.

One of the great threats to the mythical Jason and the Argonauts as they sought the Golden Fleece was passage of their ship between the forbidding rock of Scylla and the whirlpool of Charybdis. With steady hands Jason guided the *Argo* safely through the treacherous channel. To this day, Scylla and Charybdis remain a symbol of perilous hazard.

WHEN ENDURANCE COUNTS

Overcoming the perils of Scylla and Charybdis, Jason and the Argonauts demonstrated great endurance in the face of severe destructive elements. Another—and more modern—demonstration of great endurance is Kerite Cable. Under every manner of adverse condition, throughout the world, Kerite Cable stands steadfast against all the elements which would destroy its efficiency. Kerite Cables, in perfect operating condition after 40 or more years, in hazardous original installations, is the rule, rather than the exception. The world over, the Kerite name is recognized as a symbol of *durability*.

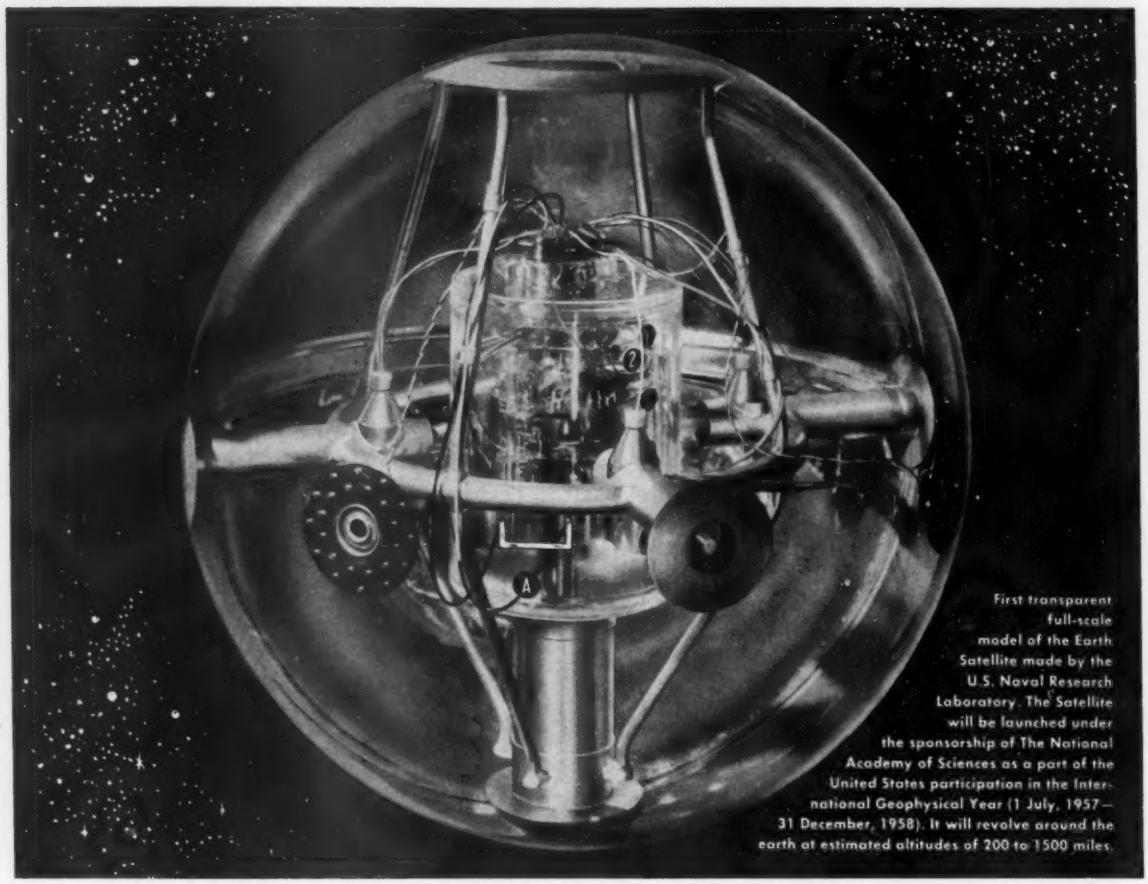
The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

Founded 1854

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston

DRIVER-HARRIS ALLOYS AT WORK IN PRODUCT ADVANCEMENT



First transparent full-scale model of the Earth Satellite made by the U.S. Naval Research Laboratory. The Satellite will be launched under the sponsorship of The National Academy of Sciences as a part of the United States participation in the International Geophysical Year (1 July, 1957—31 December, 1958). It will revolve around the earth at estimated altitudes of 200 to 1500 miles.

How measure the impact of micro-meteorites on the first "Earth Satellite"?

When physicists at the U.S. Naval Research Laboratory consider an instrument or a material to record accurately the secrets of outer space—it's not size alone that counts, but dependable, reliable precision.

The strip of "Nichrome"* evaporated on glass ("A" in the photo above) which may be fitted to the outer skin of the Satellite, measures only ¼" wide x 1½" long. Its thickness: 100 Angstrom units (1/10,000 mm). Its function: to measure the surface erosion caused by the impact of micro-meteorites. The resistance of the Nichrome ribbon increases as the film becomes pitted by meteor particles.

"Nichrome is being considered for making this gage," states the Naval Research Laboratory, "because it supplies electrical resistance in a desirable range; adheres satisfactorily to glass in thin film form; and has a very low thermal coefficient of resistance."

There'll be no one on hand, 300 miles out in space, to check on or supervise the performance of the Nichrome strip. Nichrome needs no one. It will do its job dependably there—just as it will in *your* electronic or electrical equipment, after it is in your customers' hands.

And remember, Nichrome is only one of the 132 special purpose alloys developed by Driver-Harris since 1899 for electrical heating, resistance, and electronic applications. Do you need a special alloy? Send us your specifications.

*T. M. Reg. U. S. Pat. Off.

Driver-Harris COMPANY HARRISON, NEW JERSEY

Western Representative: ANGUS-CAMPBELL, INC. • 4417 S. Soto St., Los Angeles 58 • 760 Tennessee St., San Francisco 7

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

THIS MONTH'S NEWS

English Firm Supplies Priest Rapid Turbines

The threat of costly litigation and delays on Priest Rapids Dam caused Grant County PUD to change back to its original plan of using English Electric Co. turbines in the new power house.

An attempt to enter into a supplemental contract of option to substitute Allis-Chalmers turbines for an additional $500,000 was blocked by a suit brought by E. C. Olander, a taxpayer, and a damage suit for $273,873 by James B. Metcalf & Co., representative for the English firm.

Grant County PUD dropped the substitution plan when the contractor, Merritt-Chapman & Scott, said procurement and installation of the Allis-Chalmers equipment would not proceed until the litigation was settled. The resulting delay could be as long as a year.

Washington State PUDs Plan Joint Operations

A provision of the Washington State Power Act which allows PUDs to join together in the production of power has withstood its first court test.

The act, as revised by the last legislature, provides that PUDs may establish joint operating agencies to produce, sell and distribute power.

Judge Max Church of the Clallam County Superior Court at Port Angeles denied an injunction that would have prevented the Clallam County PUD from joining some 16 other PUDs in a power pool. R. L. Keeting of Dungeness, in requesting the injunction, contended the act is unconstitutional because it is not clearly described in the title and makes no provision for hearings at which taxpayers and consumers can protest any proposed venture. He further declared the act improperly gives PUD commissioners authority to participate in a state power supply system.

The suit specifically challenged right of the PUD to spend $790 for engineering and legal services in connection with the proposed power system.

Attorneys indicated the decision would be appealed to the State Supreme Court.

Operation early next year is the latest word on this sodium reactor experiment of Atomics International, a division of North Amercan Aviation Inc. The nuclear power plant will provide the heat for operation of an electric generator being installed by Southern California Edison Co. The plant is in the Santa Susana Mountains northwest of Los Angeles

Intervening Deadline Set on John Day Permit

Federal Power Commission has set Nov. 8 as the initial deadline for filing of objections or petitions to intervene against the Klickitat County, Wash., PUD's application for a preliminary permit for hydroelectric development on the John Day site.

Pacific Power & Light, Portland General Electric and Washington Water Power companies, all jointly involved in other investigations in the Columbia basin, have been backing a partnership bill submitted to Congress by Rep. Sam Coon, Oregon, Republican.

• **Arizona Public Service** Co. and Southwest Lumber Mills Inc. are going to trade some facilities for the sake of greater economy. Arizona's Flagstaff steam-electric generating station and related equipment will be traded for Southwest's Saginaw plant and $100,000. The utility company will purchase electricity from the Flagstaff plant.

Court of Appeals Clears Idaho Power; Appeal Due

Idaho Power Co. has successfully cleared one more hurdle in its effort to legally build three dams on the Snake River. The U. S. Court of Appeals has ruled in favor of the company's project in a case brought by the National Hells Canyon Assn. A demand to set aside the Federal Power Commission license was denied.

An appeal of the decision to the U. S. Supreme Court is almost certain, and is the next fight the company faces in the prolonged controversy.

Idaho Power is currently working on Brownlee Dam under bond, giving assurance that it will not sue the government in the event the license is revoked. The arrangement was ordered by Justice Hugo Black last August.

The Court of Appeals decision states in part:

"We are not willing to accept the petitioners' characterization of the commission's action as 'administrative lawlessness.'"

THE TIME PROVEN
1929
FOR YEARS...
THE UNCHALLENGED
LEADER IN ITS CLASS
THE PORCELAIN PRODUCTS
1929 WIREHOLDER IS THE
"STANDARD", BECAUSE OF:
Good Basic Design √
Sound Engineering √
Uniform High Quality √
Competitive Pricing √
Dependable Service √
Up-to-date Packaging √
Plus a complete, quality line of secondary service materials!
62 Years
Electrical Porcelain Since 1894.
PP INC.
Porcelain Products, Inc.
FINDLAY, OHIO

Arizona Power Authority Reconsiders Plant Plan

The Arizona Power Authority has asked postponement of a proposed hearing on its plan to build a 30,000-kw steam generating plant in southern Arizona.

Since its inception, the APA request to build and operate a state-owned plant has been under fire from private utilities.

In asking postponement, E. A. Thomas, APA chairman, said it would give his agency time to obtain additional engineering data.

The delay came at a time when Arizona's public power agencies asked to be excused from the hearing on grounds their appearance "only would provoke charges and vilification between them and the power plant opponents."

Private utilities have carried their opposition to the public power issue into full page newspaper advertisements, and letters to stockholders and customers.

Several chambers of commerce throughout the state endorsed the stand of the private utilities.

But the Arizona Municipal Power Users Assn., composed of cooperatives, electrical districts and municipalities engaged in generating and distributing power—though asking to be excused from the hearing—made some strong statements.

Public Service ads were themed that a state-owned power plant would be a step toward socialism and offered these arguments against the project:

1. Even with the state's share of hydroelectric power from the Colorado River reduced 25%, there is plenty of electricity available from other sources to more than meet the state's needs.

2. The State of Arizona, through the Arizona Power Authority, holds a contract for 30,000 kw of power from Public Service's Saguaro power plant. This is as much power as the proposed state-owned plant would produce. Yet, to this date, only 5,000 kw of power have been withdrawn under the contract.

3. The cost of power to APA would be practically the same, whether it is to be purchased from the Saguaro plant or produced in a state-owned facility. This, despite the fact that a tremendous tax bill is paid on Saguaro operations—and absolutely no taxes would be paid on the state plant.

4. Arizona utilities now in the business of producing electric power have the necessary experience, know-how and financial ability to meet the future power needs of the state. They are ready, willing and capable of doing so.

These utilities have helped meet the state's power requirements in the past, and they have long range plans to fulfill future demands. There is no reason to question the continued dependability of these existing sources of power within Arizona.

5. Every Arizonan should consider carefully one of the most basic issues involved in the proposal to build a state-owned steam power plant: should the State of Arizona engage in the business of generating power, especially when such power is available from other sources?

Natural Gas Supply Sold To California Edison Co.

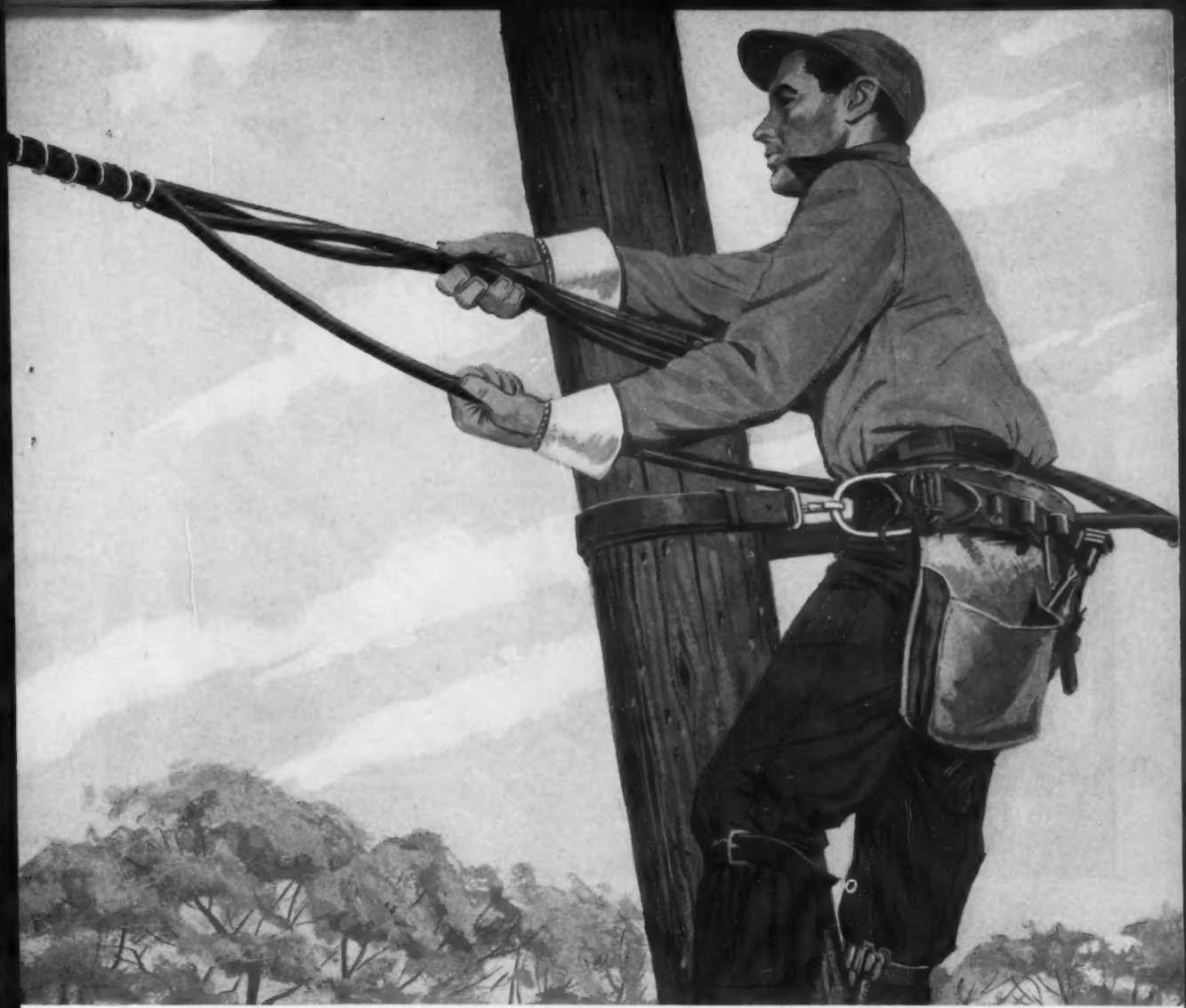
Natural gas from Richfield Oil's San Joaquin Valley reserves will be sold to Southern California Edison Co. under a contract recently negotiated.

The contract is for a period of 20 years, and will amount to an estimated $200,000,000 to $300,000,000, depending on the market conditions for gas during the contract period. The volume available to Edison will be governed by Richfield's conservation requirements.

Under the agreement, deliveries will start after Edison builds a 200-mile pipeline to the gas field—probably in 1958.

An Edison statement says the supply will cover "a significant portion of Edison's projected fuel requirements" for use in steam generation.

A sleeve-type brush has been developed by Andrew Neshem, bridge and structural steel painting contractor of Edmonds, Wash., for coating the six 6,240-ft cables Tacoma City Light has across the Puget Sound Narrows near Tacoma. Device is a group of brushes assembled in a circle that applies the single coat of asphalt as the device moves along the cable. Nesheim works 200 to 300 ft above the water while applying asphalt coat



DEMONSTRATION of slack in conductors is shown when Anaconda preassembled reverse-lay aerial cable is untwisted. Opened cables enable linemen to make connections easily—without cutting conductors or messenger.

Built-in slack helps linemen make quick taps —with Anaconda reverse-lay aerial cable

When transformers, cutouts or laterals make numerous connections necessary — Anaconda reverse-lay aerial cable permits easy separation of conductors whenever the need arises.

Lay of the conductors is reversed approximately every five feet — within easy reach of linemen. Unwound between reversal points, conductors have sufficient slack to eliminate the need for cutting conductor or messenger when making connections.

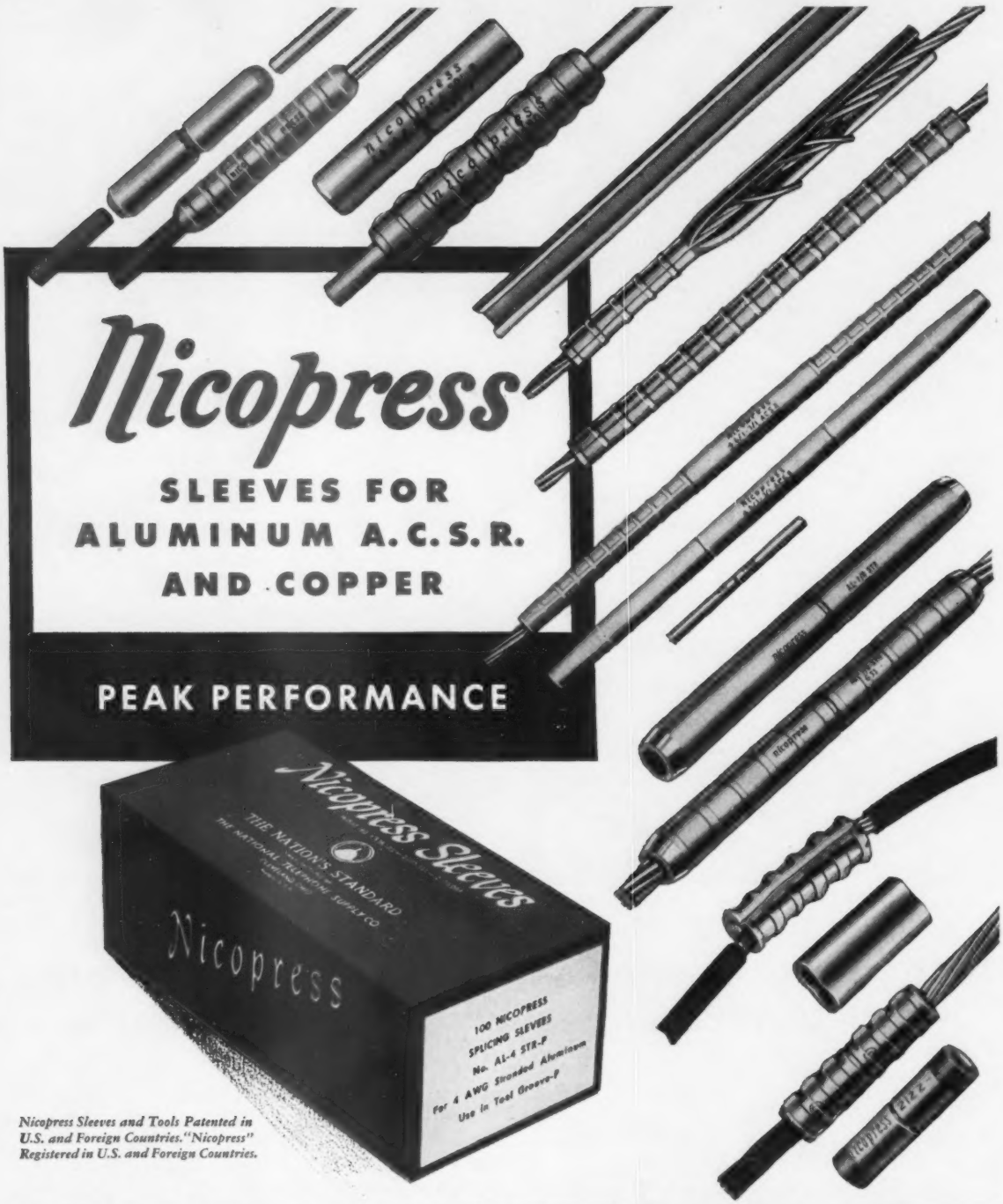
"Hot" taps can be made on 5kv nonshielded cables, eliminating power shutdowns. Opened cable allows use of wire guards and rubber blankets between the conductors for greater safety.

Ask the Man from Anaconda for full details. Call or write to: Anaconda Wire & Cable Company, 25 Broadway, N. Y. 4, N. Y.

56298 Rev.

SEE THE MAN FROM ANACONDA® FOR AERIAL CABLE

FASTEST WESTERN SERVICE — At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application*. Anaconda's Western Distributors thus can assure the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.



Nicopress Sleeves and Tools Patented in U.S. and Foreign Countries. "Nicopress" Registered in U.S. and Foreign Countries.

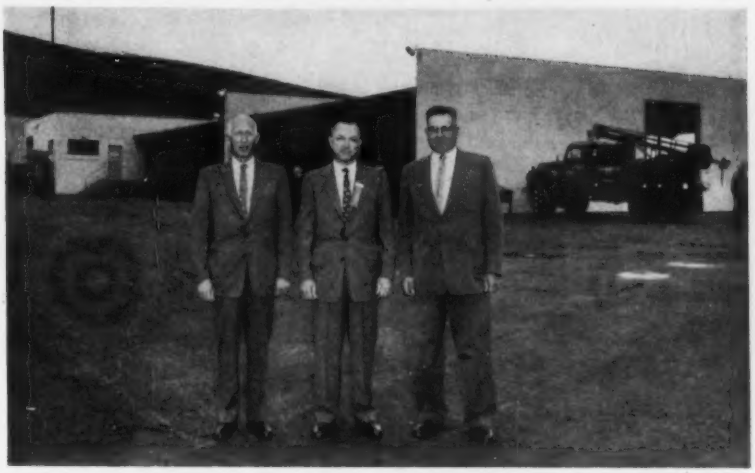
The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY



Pacific Gas and Electric's new $365,000 Colma service center was dedicated Oct. 3 with an open house and tour of the ultramodern installation. The service center is headquarters for a recently established district of the company, called the Northern San Mateo County District. In charge of operations of the district are, left to right, C. T. Gillis, general foreman of the gas department, L. W. Brillhart, district manager, and T. T. Vasconi, general foreman of the electric department. District offices are in the building at right, stockrooms at left, and garage to left of camera, out of the picture

Tacoma Project Attacked Via Legislation Route

Opposition to Tacoma City Light's efforts to build Mayfield and Mossyrock Dams on the Cowlitz River created two more possible roadblocks recently, just in case the Washington Supreme Court should decide in favor of the city in a case that is pending.

First new obstacle is an attempt by the Washington State Sportsmen's Council to initiate legislation banning any municipality from building a high dam on the river.

Second new obstacle is a petition to the State Supreme Court to cite the city for contempt of court because construction activities at the Mayfield site placed rock in the river at five points.

The case pending before the high court asks for a ruling on an old navigation law preventing municipal utilities from building projects that interfere with navigation.

To initiate the new legislation, the Sportsmen's Council must have 50,000 valid signatures of registered voters favoring the initiative by Jan. 3.

The petition for a contempt citation, sought by the state game and fisheries departments, was remanded to Thurston County Superior Court for a judgment. Tacoma is accused by the game and fisheries departments of violating a court order prohibiting them from interfering with the river or injuring fishlife, but permitting preliminary construction to continue on Mayfield.

Attorneys for Tacoma take the stand that the city is complying with the court order, which says blasting for construction purposes may be done so long as it is not in the river bed itself. They pointed out that most of the blasting was done last March and that no complaints were lodged until June when the supreme court continued a deadline set by the superior court to cease construction. Tacoma offered to drag the rock to deeper water.

FPC Okays Alteration Of Kings River Plans

Pacific Gas and Electric Co. has succeeded in getting Federal Power Commission approval on extensive changes in the plans for developing the Kings River, the north fork of Kings River and Helms Creek.

Changes include reduction in the heights of Helms and Wishon Dams 6 and 10 ft respectively, the addition of four auxiliary concrete gravity dams near the Wishon Dam, elimination of the Wishon penstock and power house and a 110-kv transmission line from Wishon to Balch power house.

The company will install two 92,000-hp turbines at Haas power house instead of the three 50,000-hp units originally planned, and two 75,000-kva generators instead of three 40,000-kva units.

The installed turbine-generator capacity of Kings River power house is to be one 60,000-hp turbine and 49,000-kva generator, an increase over the original plan.

Feasibility Report Soon On Commission Station

A feasibility report on the 312,000-kw coal-burning, steam-electric generating station under consideration by the Washington State Power Commission should be made public soon.

Ford, Bacon & Davis, engineers, has given the commission an estimate of $60,000,000 as the amount of the bond issue for financing the plant.

The commission is exploring the steam generation idea on the theory that the time is approaching when steam generation will be economically competitive with hydro. Production of the steam plant would be used to firm up interruptible hydroelectric power the commission would buy from Bonneville Power Administration.

The plant would probably be located in the Roslyn-Cle Elum coal mining area where pay rolls are threatened by the advent of natural gas.

Vote Defeats Selling Shoshone Co-op System

A vote by stockholders of the Shoshone River Power Co-op of Cody, Wyo., failed to get a two-thirds majority needed to sell the co-op to Pacific Power & Light Co. The vote was 154 to 132 in favor of the sale.

Sale of the cooperative, which would have set a precedent in Wyoming, was strongly opposed by the Wyoming Rural Electric Assn.

NEW
360°
ATTENTION SIGNAL
®
GYRALITE

REVOLVING
DUAL BEAM
for:

Shops and Plants on material handling trucks, and other hazardous equipment.

Work Areas where workmen may be concealed from operators of moving equipment.

Emergency Vehicles requiring right-of-way on streets and highways.

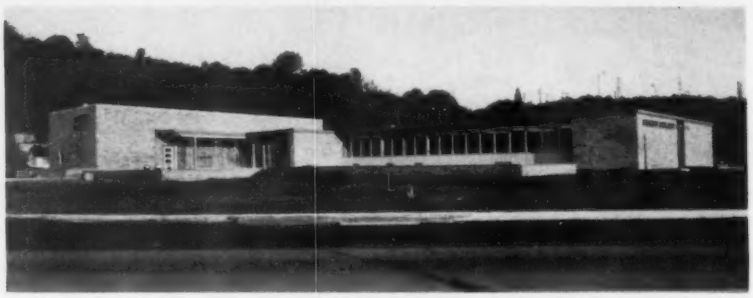
Roadside motels, shopping centers and filling stations.

CHOICE OF VOLTAGES, MOUNTINGS AND COLORS

Sold Nationally Through Authorized Distributors

SINCE 1897
THE PYLE-NATIONAL COMPANY
WHERE QUALITY IS TRADITIONAL
1334 N. Kostner Avenue, Chicago 51, Ill.

The cashier counter adjoins the accounting department for easy access to the records



Puget Sound Power & Light's Central Division is now housed in this attractive building

Puget Sound P&L Moves Into New Headquarters

Puget Sound Power & Light's central division headquarters has been moved from the Electric Building in Seattle to new quarters at 620 Grady Way, Renton, Wash.

A firm of consultants had recommended the move because the company does not serve Seattle, and a subsequent building program resulted in a new systems operation center near Kirkland, two new buildings at Renton, and a fourth building at Kirkland that will be completed this month.

The Renton facilities house all of the central division staff and 90 operating men.

Dual Fuel Generators For Three BCE Areas

Dual-fuel generators to take advantage of natural gas fuel while still being operable on diesel oil will shortly be installed in three British Columbia power distribution areas.

The units, Cooper-Bessemer generating sets of 3,000-kw capacity each, will be installed in Prince George, Dawson Creek and Quesnel by the British Columbia Power Commission. Delivery started in October and will run through to January.

Simson-Maxwell Ltd. of Vancouver, supplier of the units, four for Prince George, and three each for Dawson Creek and Quesnel, describe the order as one of the largest of its kind ever placed in Canada.

BCE Seton Plant Starts Turning Out Kilowatts

Operations have now commenced at the Seton plant of British Columbia Electric Co., where a new $8,700,000 hydroelectric development has just taken place, one mile south of Lilloost, B. C., on the Fraser River.

The general contractor, Emil Anderson Ltd., has been working on the 58,500 hp project since late in 1953.

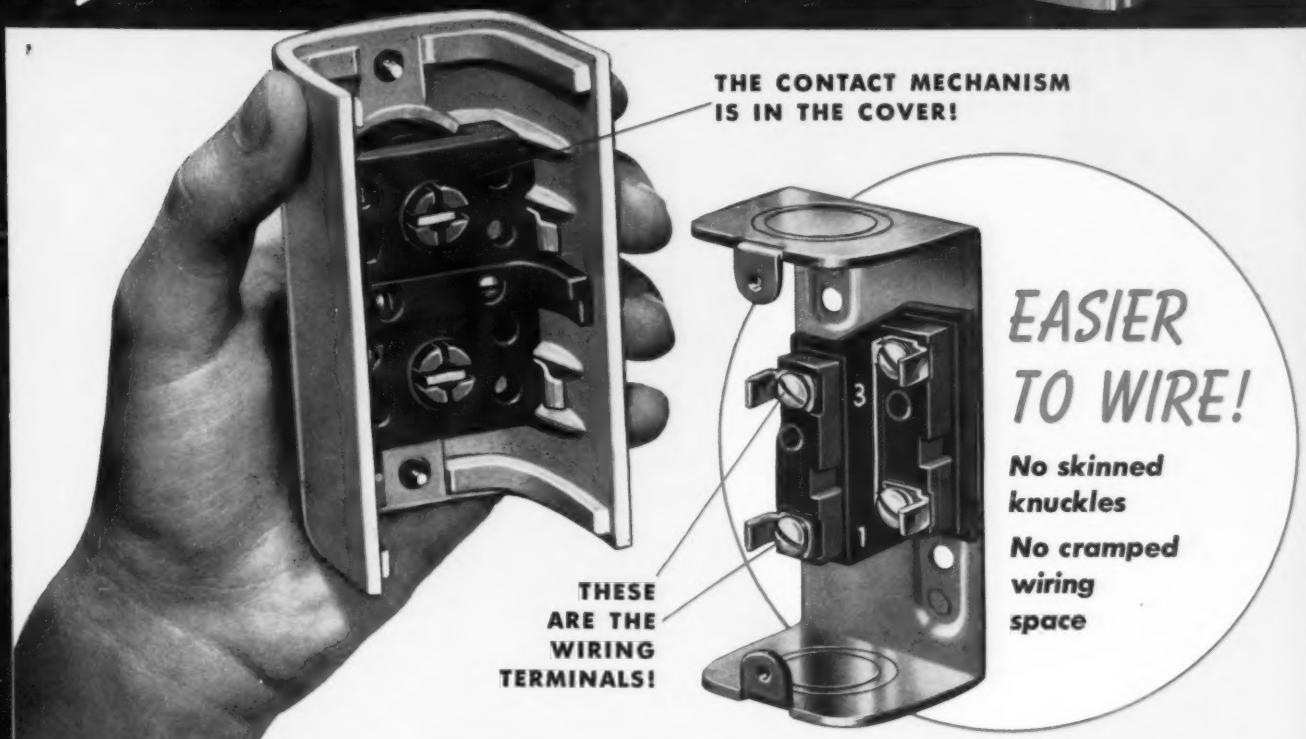
Seton uses a second time the water that has already spun four big generators at Bridge River power house. The water flows to the new plant from Seton Lake via a 12,000-ft canal.

Kansas Industrial Firm Proposes Wyoming Plant

National Processing Co., Arkansas City, Kan., filed for a preliminary permit from the Federal Power Commission to build a hydroelectric plant on Fremont Creek, Sublette County, Wyo.

The proposed plant would feed power to the Lincoln Service Co. of Frontier, Wyo.

Brand New Idea in STANDARD-DUTY STATIONS



EASIER TO WIRE!

No skinned knuckles

No cramped wiring space

Here's an entirely new idea in push button stations—a wrap-around cover—with the contact mechanism part of the cover. Removing the cover exposes the terminals for instant and easy wiring. Strong, spring type, silver plated contacts connect the push button assembly in the cover with the terminals in the base.

Matching ribs in the cover and notches in the terminal blocks assure that the wiring connections are always correctly made. A bakelite shield protects the contact mechanism and prevents careless wiring from interfering with the contact operation. Concentric knockouts are provided in both top and bottom of the heavy metal base.

You will want to know about this new standard-duty station because—it is good looking—it takes less time to install—it was designed for the convenience of the installation engineer.

Let us show you a sample of this "brand new idea" in standard-duty stations!

A-B Quality

ALLEN-BRADLEY

QUALITY

MOTOR CONTROL

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ontario

Bulletin 800 standard-duty push button stations can be supplied with one, two, or three buttons, or as a selector switch. Also available with pilot light. Furnished only in NEMA Type 1 enclosures.

9-56-MR

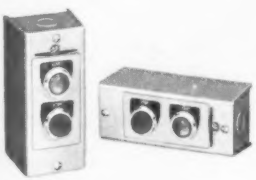
Also... NEW HEAVY-DUTY PUSH BUTTONS

BULLETIN 800

NEW FLEXIBILITY!

You can assemble any special heavy-duty station from a small stock of standard push button, selector switch, and pilot light components. There is no need to wait for long delivery of your special stations.

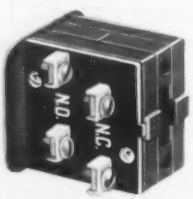
Stations can be arranged for either vertical or horizontal mounting. Name plates can be rotated to any position, replaced with any standard marking, or removed entirely.



NEW ENCLOSURES!

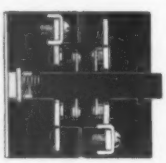
Each button, selector switch, or pilot light is a self-contained unit which can be mounted in attractive new enclosures. Standard enclosures accommodate up to eight units, but enclosures can be furnished for larger numbers.

NEW CONTACT BLOCK!



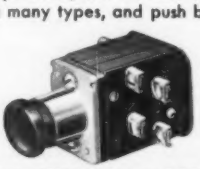
Above: View of contact block, showing terminals for normally open and normally closed contacts. Right: Contact block, with cover removed, showing stationary silver alloy contacts and pushrod carrying the moving contacts.

Bulletin 800 heavy-duty push buttons have the same molded contact blocks that have proved so dependable in Bulletin 800T oiltight push buttons, although they are not themselves oiltight. And all of them are equipped with double break, silver alloy contacts.



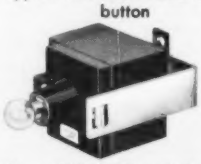
NEW OPERATORS!

Operators, which mount on the contact block, are available in many types, and push buttons come in various colors.



Type AK2B flush head START button

Type DK6A mushroom head button



Type PK16 pilot light with transformer

Type EK11B cylinder lock unit

9-56-MR

A-B Quality

ALLEN-BRADLEY

QUALITY MOTOR CONTROL

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. In Canada—Allen-Bradley Canada Ltd., Galt, Ontario

Bids and Contracts

• **Prospective bidders** for south shore construction of Ice Harbor lock and dam are invited to a pre-bid conference at 1:30 p.m., Nov. 27, in building 710 of the Corps of Engineers district office at Walla Walla.

• **S. Morgan Smith** Co. has the contract to supply five hydraulic turbines for the Swift Creek plants to be built by Pacific Power & Light Co. and the Cowlitz County PUD. Value is reported to be in excess of $3,250,000.

• **C. H. E. Williams** Co. Ltd. has a contract to repair lighting on Lions Gate Bridge, Vancouver, B. C., for $7,199.

• **Rocky Reach Dam Builders** have a contract for first-step work at Rocky Reach Dam in the amount of $12,038,091. Arundel Corp., L. E. Dixon Co., Hunkin - Conkey Construction Co. and American Pipe & Construction Co. are members of the syndicate.

• **Strong** Co., Springville, Utah, has a $1,156,244 contract to construct the first five miles of access road to the Glen Canyon dam site of the Bureau of Reclamation.

Bonneville Awards

The following are recent contract awards made by Bonneville Power Administration to various suppliers and builders.

Neals Lumber Co., Libby, Mont., $35,153, and **Koppers Lumber** Co., Seattle, $14,026, to supply poles on bid invitation 8120.

Roy C. Gibson, Albany, Ore., $29,400, to supply maps and survey data on bid invitation 8126.

E. A. Messer & Associates, Hillsboro, Ore., $11,975, to supply maps and survey data on bid invitation 8127.

V. A. Lockyear, Portland, and **Cascade Piling** Co., Tacoma, will supply spar crossarms as follows: groups A, B and C, $13,521, Lockyear; group D, $23,796, Cascade.

Olson Electric Co., Vancouver, Wash., for $15,924, will build band No. 2 at Aberdeen substation.

Hathaway Instrument Division, Hamilton Watch Co., Denver, $46,596, for automatic oscillographs.

Mann Construction Co., Redmond, Ore., $7,817, to construct snow shelters over outside stairways at Anaconda substation.

for Better and Easier—
STORE FRONT LIGHTING INSTALLATIONS

Revere ELECTRIC MFG. CO. CHICAGO, U.S.A. WALL and ROOF BRACKETS

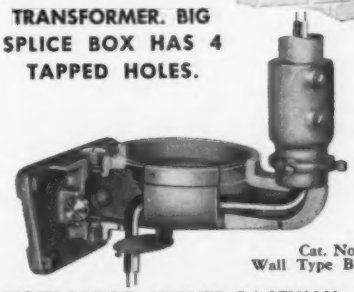
(PATENTS PENDING)

EASIEST TO WIRE AND INSTALL

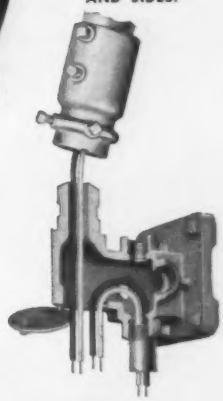
ARM AND LUMINAIRE WIRED IN ADVANCE. FITTER SLIPS OVER POST AND YOUR HANDS ARE FREE.

AMPLE ROOM BELOW TRANSFORMER. BIG SPLICE BOX HAS 4 TAPPED HOLES.

NOTE HOW WIRES FROM ASSEMBLED ARM AND LUMINAIRE RUN STRAIGHT THROUGH. "X" TYPE SPLICE BOX PERMITS CONNECTIONS FROM TOP, BOTTOM AND SIDES.

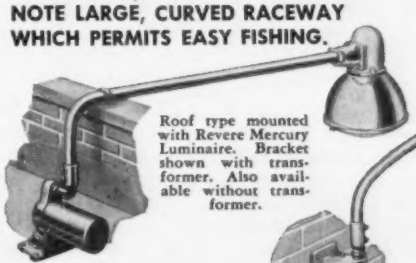


Cat. No. 861
Wall Type Bracket Only

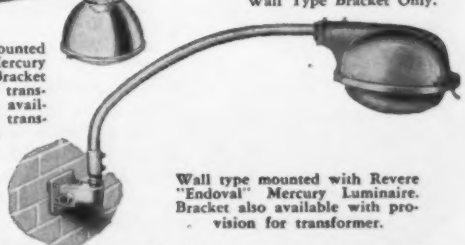


Cat. No. 860
Wall Type Bracket Only.

NOTE LARGE, CURVED RACEWAY WHICH PERMITS EASY FISHING.



Roof type mounted with Revere Mercury Luminaire. Bracket shown with transformer. Also available without transformer.



Wall type mounted with Revere "Endoval" Mercury Luminaire. Bracket also available with provision for transformer.

Revere scores again with this outstanding series of Wall and Roof Brackets. They are Superior in Design — Quality and Performance . . . of Heavy-Duty Cast Aluminum Construction and save hours in Installation time through simplified provision for wiring. Available with 1¼ inch aluminum arms or with hot-dip galvanized steel arms for mounting Revere Mercury or Incandescent Luminaires. Arms are locked in position with heavy cup-point screws. Roof type arm swings over parapet. Wall type swings back to wall for safe, easy servicing.

Write for Catalog Data and Prices

REVERE ELECTRIC MFG. CO. • 6009-17 BROADWAY • CHICAGO 40, ILL.

Available in Canada thru Curtis Lighting, Ltd., Leaside, Toronto, Ontario

THE ONLY COMPLETE LINE OF LUMINAIRES - FLOODLIGHTS AND POLES FOR STREET - SPOR AIRPORT - SERVICE STATION - OUTDOOR THEATRE - MARINE AND INDUSTRIAL LIGHTIN

the new
complete source
of information on
fine FANNER
Superformed
LINE CONDUCTOR
ACCESSORIES
the new
FANNER CATALOG
ARMOR RODS
PATCH RODS
TAP ARMOR
PLASTIC
FANNGUARDS
ALUMINUM
LINEGUARDS
FANNGRIPS
Fine Fanner
Superformed
The FANNER MANUFACTURING COMPANY
This new FANNER Catalog illustrates and describes the wide range of Superformed Line Conductor Accessories . . . gives selection tables, application data and suggested installation methods. Get acquainted with this catalog now so that when you need accessory items for overhead distribution and transmission lines, you can take advantage of the many extra features of Fine FANNER Superformed products. Each product in the FANNER Superformed line is precision manufactured to install easier and perform better on the job. Careful packing insures safe delivery and simplified storage. Highest quality materials provide long life regardless of the type of installation. With all their extra features, FANNER Superformed products cost no more than ordinary products.
For the latest data on line conductor accessories — information that will be of exceptional value to you, write for the new FANNER Catalog EP6 today!
Licensed for use under Patent No. 2,275,019
THE FANNER MANUFACTURING CO.
Electrical Products Division
Brookside Park • Established 1894 • Cleveland 9, Ohio
AGENTS AND DISTRIBUTORS IN PRINCIPAL CITIES

Bridge River Expansion Gets Commission Okay

British Columbia Electric Co. has received approval of the B. C. Public Utilities Commission on an application to enlarge its 186,000-kw Bridge River plant an additional 240,000 kw.

The expansion will be accomplished by building a second tunnel diverting Bridge River through a mountain into Seton Lake, and another dam downstream from LaJoie Dam.

North Clackamus Project Gets Commission Okay

As the Oregon Hydroelectric Commission licensed the North Clackamas River developments, Portland General Electric Co. gave a go-ahead to contractors and suppliers for the $20,000,000 project.

Before receiving the license, PGE reached agreement with the game and fish commissions regarding handling of fish at the projects, particularly salmon and sea-run trout.

Federal Power Commission licenses had already been granted.

Guy F. Atkinson Co. will build the dam, power house, spillway and Faraday tunnel, the canal enlargement and revisions of the Faraday power house. PGE will supply all of the equipment to be installed and furnish the concrete and steel.

Completion is set for November 1958. The projects will add 78,000 kw generating capacity.

Heco Whittles Amount Of Planned Stock Sale

High interest rates have caused Hawaiian Electric Co. to cut a planned preferred stock sale from $5,000,000 to $3,000,000. Dillon, Reed and Dean Witter & Co. had an investment group offering to buy the issue of cumulative preferred stock.

Heco will issue 77,000 more shares of common stock as another part of its fund-raising program. Stockholders will be allowed to subscribe on a one-for-ten basis, and will be allowed to oversubscribe in order to buy issues not purchased by other stockholders.

The company has budgeted expansion to cost $7,000,000 in 1956, and $41,000,000 between 1956 and 1960.

• **Hilo Electric Co.** will spend $200,000 to build a substation to serve some 2,500 customers acquired in a merger with Kona Light & Power Co. this year. A diesel plant will be retired.

"Me--an engineer?"

When a boy asks this question, a "yes" may lead to his becoming a key man in a key profession. As an engineer, he will be doing some of the most essential work in his generation... designing a refinery, planning a power station, laying a pipeline. Our country needs twice the number of engineers it now has.

Bechtel, in the mainstream of engineering, technological and industrial developments, has good reason to know that as great as are today's opportunities for the technically trained man, tomorrow's will be greater.

America is the winner every time engineering gains another recruit.

BECHTEL

BECHTEL CORPORATION
Engineers and Constructors
Los Angeles • SAN FRANCISCO • New York
Canadian Bechtel Limited • *Toronto* • *Vancouver*

Before: Beat-up

Now: Like new!

G-E Service Shop

Your local G-E Service Shop uses mass-production methods when it rebuilds your old distribution transformers. Result: high-quality work at low cost . . . prompt pickup and delivery . . . and no worries for you. And you get new-unit warranties! There are 52 G-E Service Shops throughout the country—one near you. 431-32

Progress Is Our Most Important Product

GENERAL ELECTRIC

Glen Canyon Project Causes Reappraisal

Because of low Colorado River water and construction of Glen Canyon Dam, Arizona will have to reappraise its proposed Bridge Canyon Dam on the Colorado, according to K. S. Wingfield, Arizona Power Authority Commissioner.

An entire new engineering study of the river and possible alternatives in view of changed conditions will be required, he said.

A high Bridge Canyon Dam was proposed by the Bureau of Reclamation, but this may not now be feasible. Glen Canyon Dam water releases will be geared to power requirements in the market area where the power will be sold. However, so far no firm decision has been reached on where that market area will be, he said.

"But if most of the water is released during the winter to generate power for areas in Utah and Colorado where they have high winter power demands, the Bridge Canyon Dam might be of very little use to Arizona," Wingfield said.

Present peak power requirements in Arizona are in the summer, due to large consumption for irrigation and cooling systems.

Low Colorado River flow already has rendered Hoover Dam practically valueless to Arizona as a power source, Wingfield said, because Los Angeles gets most of the diminishing value of the plant.

As an alternative to a high dam at Bridge Canyon, Wingfield will investigate the feasibility of a series of lower dams, or a diversion dam with a tunnel through the huge loop of the river at the head of Lake Mead.

He also advocates looking into the possibility of the state building Marble Canyon Dam instead of Bridge.

British Columbia Firm Starts Big Hydro Job

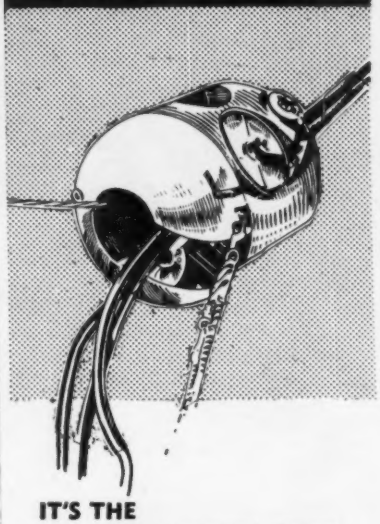
A $43,000,000 hydro project has been undertaken by British Columbia Electric Co. The plan calls for a 2½-mile tunnel diverting the waters of Bridge River into Seton Lake and the erection of a 150-ft high dam.

The dam will be downstream from LaJoie Dam and will reuse the same water.

Construction will start later this year, and it is expected that the last of four 60,000-kw generators will be installed by 1961.

Bridge River plant of the B. C. Electric now generates 248,000 hp, and the new plant will add another 320,000.

THREE TO ONE



IT'S THE
NEALE MODEL "K"
Only the
Model "K" Spinner
PLACES & SPINS
THREE SINGLE CABLES
Into
ONE COMPACT UNIT

ALSO SPINS SINGLE CABLE PERFECTLY

WRITE FOR LITERATURE AND PRICES

CABLE SPINNING EQUIPMENT CO.
3100 TOPEKA AVE.
TOPEKA KANSAS
Phone 2-7234

OVERSEAS SALES:
Ericsson Telephone Sales Corp. of New York
Automatic Electric of Canada
Pirelli of Great Britain

Franchise Tax Costs Passed to Customers

The Wyoming Public Service Commission has authorized Montana-Dakota Utility Co. to pass on to all power and gas consumers in the Sheridan area the costs of franchise payments it makes to the city of Sheridan.

The PSC also ruled that excise taxes imposed on the utility by the city of Sheridan could be passed on only to city consumers on a pro rata basis.

The PSC said the franchise contract between Sheridan and MDU, calling for the utility to pay 1% of its gross receipts in exchange for use of Sheridan streets and alleys, can be charged off as a business expense and reflected in bills to consumers in Buffalo, Kaycee and neighboring communities.

A recently imposed Sheridan occupation tax of $15,000 yearly on MDU's natural gas operations and $15,000 on its electrical business can be passed on only to utility subscribers within the Sheridan city limits. MDU was also authorized to charge Sheridan subscribers 2% of the tax, or $600 a year, for accounting costs.

The PSC was specific in differentiating between a franchise tax and an excise tax.

The PSC decision noted a movement of Wyoming cities toward taxing utilities as a means of raising revenue without hitting the taxpayer's pocket.

"Cities have singled out utilities as a new source of municipal revenue and the utilities have no control over taxes or where they may be imposed," the PSC said. "Apparently the courts can't regulate these taxes and the legislature hasn't set any limits on municipal-taxing power.

"Consequently the PSC feels that Montana-Dakota Utilities is justified in charging its customers on a pro rata basis any municipal tax aimed at raising revenue."

The PSC also ruled that any franchise payments more than 1% of the gross revenue would be considered as an excise tax. The commission said it considered the 1% gross receipts tax a "reasonable amount" for use of the city's streets and alleys.

• **The sixth** 64,000-kw generator at Chief Joseph Dam went on the line Oct. 1 to bring the project generating capacity to 384,000 kw. There will be 16 units in the initial installation at the dam.

• **Puget Sound Power & Light** Co. has been granted a $3,000,000 reduction in its valuation for tax purposes by the Washington State Board of Equalization. The new figure is $64,000,000.

Just one application of "Telvar" controlled weeds around this fence. Note the type of vegetation involved in untreated area in the foreground.

Spray just once with

Du Pont TELVAR®

WEED KILLERS

When you use "Telvar" weed killers, vegetation is killed through the roots, and regrowth is prevented because the chemical remains in the soil . . . provides residual action all season long. And low dosages (1 to 1½ lbs. per 1,000 sq. ft.) make it cost little for the results you obtain. Such low rates also mean less handling, less use of storage facilities.

"Telvar" weed killers come as wettable powders, are non-corrosive, non-flammable, non-volatile, low in toxicity to humans and livestock.

Include "Telvar" weed killers in your weed-control program this year. Prove to yourself how these products of Du Pont research can help cut your maintenance cost to new low levels.

Where brush is a problem, Du Pont Ammate® X weed and brush killer is the product you need. It kills more kinds of brush with unusual safety. With ordinary precautions, "Ammate" X may be used close to such crops as cotton, tomatoes, soybeans and peanuts.

• • •

FREE ILLUSTRATED BOOKLETS describe how to control weeds and brush with Du Pont chemicals. Write to Du Pont, Grasselli Chemicals Dept., 111 Sutter Street, San Francisco 4, Calif.

DU PONT
REG. U. S. PAT. OFF.

On all chemicals, follow label instructions and warnings carefully.

WEED and BRUSH KILLERS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

FOR *Quality* WITHOUT *Question*

450 KVA, three phase, dry type transformer, Primary 480 Secondary 208Y/120, 4—2 1/2% FCBN

The Beverly Hilton uses only the finest, from champagne to transformers.

The fabulous Beverly Hilton has installed Marcus Transformers with a total capacity of approximately 2000 KVA. This guarantees them complete dependability and uninterrupted, trouble-free service for their power and lighting distribution.

A complete line of dry and liquid-filled transformers up to 5000 KVA.

Representatives in Principal Cities

Marcus TRANSFORMER CO., Inc.
RAHWAY, NEW JERSEY

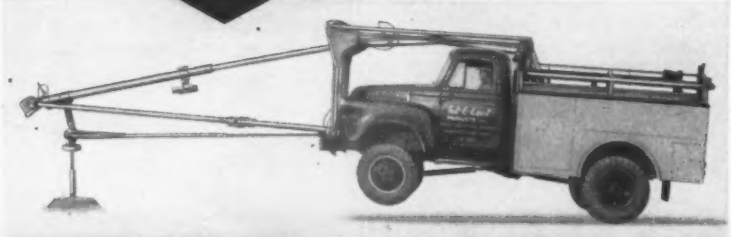
"Mark of Quality"

NOW! DIG HOLES SET POLES HYDRAULICALLY!

- Work across obstacles . . . up hills . . . down ditches
- Control it from the cab . . . from the front . . . from the rear
- A single lever raises the self-storing derrick and digger
- Complete operation controlled with one double-acting cylinder

Hydraulic derricks and diggers, now furnished in complete kits, provide new safety features and working ease for telephone, utility and power line crews when digging holes and setting poles. Offered in three complete "packages" for handling poles up to 55′ long. *Write for Bulletin H866.*

Distributed by: Am. Equipment & Body Co., Los Angeles 21; Robblee's Utility Equip. Co., Seattle; Utility Body Co., Oakland 7; Williamsen Body & Equip. Co., Ogden, Salt Lake City, Utah, Pocatello, Ida.; Douglas Hood Co., Portland, Ore.



TEL-E-LECT PRODUCTS INC. 10025 Minnetonka Blvd. Minneapolis 26, Minnesota

Wyoming REAs Seek Change in State Taxing

The Wyoming Rural Electrification Assn. has presented arguments for a gross receipts tax instead of the present ad valorem tax on REAs at a public hearing held by the Wyoming legislative interim committee.

As an alternate to a gross receipts tax, the REA group suggested consideration of original cost of property in determining the fair value of a system, kilowatt-hour tax or an across-the-board excise tax on lines, substations and other equipment.

Wyoming REAs have been subject to ad valorem taxation since 1955.

Ice Harbor Bid Date Moved to December 18

The Corps of Engineers expects to open bids Dec. 18 at Walla Walla for south shore construction on Ice Harbor Dam on the Snake River.

Unwatering the cofferdam, excavation for a six-unit power house, forebay and tailrace, 7½ spillway bays, a permanent fish ladder and the south shore abutment, plus access railroad and roads, are in the bid.

Structures will include the 620-ft substructure, intake structure, intake gates and bulkheads for the power house, 7½ bays of the spillway structure, the 40-ft nonoverflow section of the dam between the power house and the south shore embankment, the fish ladder and the fishway pump house.

The work is to be completed by the end of 1958.

Garkane Power Group Plans Utah Project

Garkane Power Assn. Inc. of Richfield, Utah, has filed an application with the Federal Power Commission for a license for a hydroelectric project on the east and west forks of Boulder Creek in Garfield County, Utah. The cost of the project is approximately $1,600,000.

The initial development of the project would be located on the east fork of Boulder Creek, a tributary of the Escalante River. It would have two 1,975-hp turbines connected to two 1,400-kw generators with provision for an additional unit.

A rock fill dam 10 ft high and 50 ft long on west fork of Boulder Creek diverting the flow through a 24-in. steel pipe to the east fork Boulder Creek reservoir is scheduled for future development.

PACKAGED TO DO BUSINESS

Carol Cable is easy to sell because it's easy to stock. Convenient cartons tell at a glance the type of cable . . . provide for perpetual inventory control. Boxes are sturdy, easy to handle, and are self-dispensing. Because Carol Cable gives reliable, long-lasting service, you'll keep old customers coming back . . . make new ones. Find out how Carol quality cable in a quality package can pay off for you.

A SUBSIDIARY OF Penn-Texas

Carol®

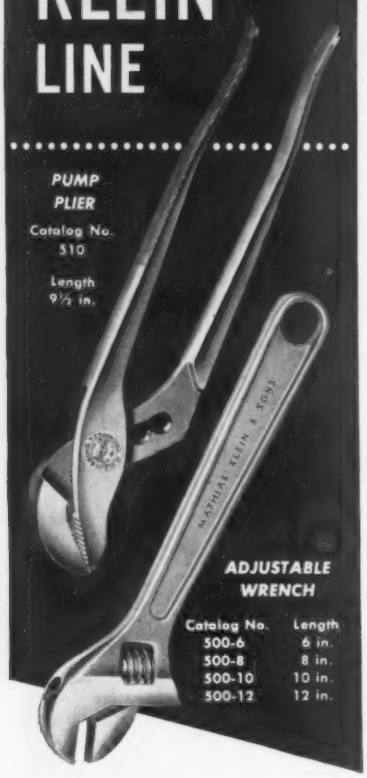
NEMA

CAROL CABLE COMPANY

Division of The Crescent Company, Inc., Pawtucket, Rhode Island

• SERVING INDUSTRY FOR OVER 30 YEARS

2 NEW PRODUCTS in the KLEIN LINE



These new high-quality tools have been added to the Klein line.

A Pump Plier that gives easy one-hand operation and a firm grip in any of four positions.

And the new Klein Adjustable Wrenches of drop-forged alloy steel, light in weight, chrome plated for lasting protection and service.

Write for Bulletin

Bulletin No. 1157 on these two Klein tools is now available. Send for your copy.

Mathias Klein & Sons
7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS

Provisional Power Goes To BPA Industrial Users

Provisional power was made available to Pacific Northwest electrochemical industries served by Bonneville Power Administration as the annual fall-off of Columbia River flow caused BPA to cut off 500,000 kw of interruptible power.

The industries affected chose to borrow water from Hungry Horse Dam for generation of power. The water must be replaced by spring water flow, and the kilowatts are repayable by curtailed operations of the industries in the event the water is not replaced.

The industries have also contracted for 100,000 kw of power from the California-Oregon Power Co.

Heco Signs Labor Pact With IBEW Local

Hawaiian Electric Co. in Honolulu has signed a new 2½-year labor contract providing wage boosts, a modified union shop and improved retirement and vacation benefits for 834 employees.

The contract with Local 1260, IBEW, gives wage increases now of 2 to 12c an hour with similar boosts July 1, 1957, and May 1, 1958. The contract runs to Feb. 28, 1959.

Trades and crafts scales have a $1.41 an hour minimum and $2.83 an hour top rate with the current boosts.

Seattle Officials Want Fast Action on Project

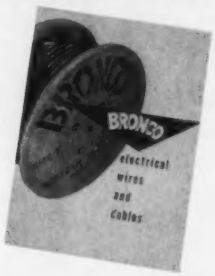
Following unanimous city council approval of an ordinance authorizing Seattle City Light to apply to the Federal Power Commission for a license to construct the Boundary hydroelectric project on the Pend Oreille River, city officials announced plans to press for early action by the federal agency.

The FPC granted the municipal utility a preliminary permit in 1954 to study the project. These studies show the project to be economically feasible.

The project originally was objected to by mining interests of the area, whose properties would be flooded by the reservoir behind the dam, but a new site has been selected that will overcome these objections, City Light feels.

Plans call for a 540,000-kw plant costing an estimated $125,000,000 and requiring six or seven years for construction. The Bonneville Power Administration will be asked to wheel the power over its transmission lines some 300 miles from the dam to Seattle.

new catalog of wires and cables



including a complete listing of

BRONCO 66 CERTIFIED

flexible electrical portable cords and big cables with 67.32% Neoprene jackets.

Send for your FREE copy:

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

WADSWORTH

New "E-Z-RED" CIRCUIT BREAKERS 12 - 16 OR 20 BRANCH CIRCUITS SINGLE AND/OR DOUBLE POLE

100 AMP. FUSIBLE MAIN DISCONNECT FOR "E-Z-RED" (15 TO 50 AMP.) CIRCUIT BREAKER BRANCH CIRCUITS

The WADSWORTH ELECTRIC MFG. CO. INC.
Covington, Kentucky

WRITE FOR FREE CATALOG

Tacoma Utilities Change Taken Off Nov. Vote

The Tacoma City Council has rescinded an earlier action which called for a vote at the Nov. 6 general election on a charter amendment transferring the water division from the utilities department to the public works department. It reversed itself when informed by the county auditor that the measure would have to qualify as an emergency act to be included on the ballot.

The water and light divisions have been operated together since 1912, and have combined many of their operations.

Snohomish PUD Applies For Preliminary Permit

Public Utility District No. 1 of Snohomish County, Wash., has filed an application with the Federal Power Commission seeking a preliminary permit for a hydroelectric project on the north fork of Snoqualmie River, Hancock Creek, Calligan Creek and Tolt River in King County, Wash.

The proposed project would consist of an earth dam on the north fork of Snoqualmie River; two low diversion dams on the downstream tributaries raising the levels of Calligan Lake and Lake Hancock, Calligan power house with an installed capacity of about 6,000 kw, Beaver Creek power house with an installed capacity of about 20,000 kw, Griffin Creek power house with an installed capacity of about 13,500 kw and Tolt River power house with an installed capacity of about 22,500 kw.

Power developed would replace a portion of the power that is now purchased from the Bonneville Power Administration.

• **Corps of Engineers,** Portland district, has announced it will open bids Dec. 4 at 2 p.m. for six 82,105-kva generators for The Dalles power house. The work calls for the design, manufacture, delivery, installation and test of the units, the final group of No. 9 through 14 in the initial phase. Test of the installed generators must be completed by Nov. 1, 1960.

• **The Wyoming Public Service Commission** has authorized Riverton Valley Electric Assn. Inc. to obtain a $50,000 loan from the Rural Electrification Administration. Riverton Valley will use the funds to loan money to its consumers to purchase load-building electric appliances.

You'll Find More True Economy in Lighting Units by STEBER

Lifetime cast aluminum Steberlites give you economy—economy in quicker, easier installation, lower maintenance costs and in overall lighting efficiency.

Steberlites will solve most every lighting problem easily and effectively. They mount quickly to poles, outlet boxes and walls and can be used as single units or in multi-lamp clusters. Weatherproof articulated joints allow universal aiming. Silicone lamp gaskets assure complete weather protection. A wide variety of Steber fittings lets you tailor-make lighting units to any special requirement.

Steberlites accept PAR-38 and R40 medium or mogul base spot and floodlamps. S-400 shown above uses the 300 watt, 80,000 candlepower PAR-56 lamp. Color lenses are available for special effects.

Write for Steberlite literature now. See why versatile Steber units can serve you best.

New Condensed Catalog CTC-1 available upon request.

Lighting Units STEBER *for Every Need*

STEBER MANUFACTURING CO. • Dept. 57, Broadview, Illinois

STEBER MANUFACTURING CO. OF CALIFORNIA
242 So. Anderson St., Los Angeles 33, Calif.

STEBER-WOODHOUSE, LTD.
33 Ingram Drive, Toronto, Canada

SOLD THROUGH LEADING DISTRIBUTORS

NEWS ABOUT PEOPLE

Kelm Retirement Starts Utah Personnel Changes

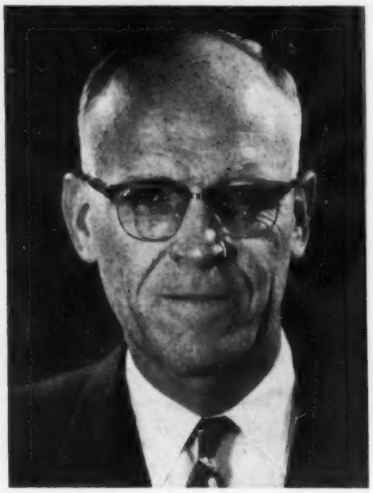
Retirement of A. C. Kelm, assistant chief engineer of Utah Power & Light Co. on Oct. 1 brought about a series of promotions in the company's engineering department.

Ralph A. Radford has been named assistant chief engineer. Edgar W. Hampel, general distribution engineer, assumes distribution and planning duties formerly handled by Kelm. Herm Rohner was promoted to transmission engineer.

C. L. Ericson, former transmission engineer, is now assistant to the chief engineer. Robert W. Moody, senior engineer, is promoted to system electrical engineer, and William E. Clements Jr. is promoted from senior engineer to distribution engineer.

• Sherman Chickering has been elected a member of the board of directors and the executive committee of San Diego Gas & Electric Co. He succeeds his father, Allen L. Chickering, who resigned. Chickering is legal counsel on the company's rate and financial matters.

Lage



Barton

• **Stanley B. Barton** and **Emil J. Lage** have received promotions in the Pacific Gas and Electric Co. executive organization. Barton is now assistant manager of the land department and Lage succeeds him as manager of the valuation department. Barton is to become manager of the land department upon the retirement of **B. K. Dunshee** Jan. 1. Both Barton and Lage have been with PG and E since graduation from college, Barton from the University of California in 1924; Lage from Iowa State in 1925.

Grosse

Cox

• **R. P. Grosse,** San Francisco manager of inside construction sales for Graybar Electric Co., leaves the Bay Area for the first time in his Graybar career to become branch manager at El Paso. He has been with Graybar since 1934.

• **Arthur R. Cox** has been elected vice-president and treasurer of San Diego Gas & Electric Co. He has been serving as comptroller since February 1956 when he was named to that post. Cox has 28 years with the company and is a graduate of Nevada University.

• **Arthur B. O'Roke,** operating foreman of Pacific Gas and Electric's underground electric department, has retired after 34 years with the company.

• **John H. Fraser,** Sacramento, has been appointed a field representative of Pacific Gas and Electric's tax department, and will headquarter in San Francisco.

• **Leeds & Northrup** Co. has opened a new district office in Denver. **Arthur Gneiser,** formerly a sales engineer in the company's Detroit office, is manager. The new office is in the Denver Theater building.

• **Jesse D. Graham** has joined the control systems division of Ramo-Woolridge in Los Angeles.

• **C. J. Hawkes,** Seattle branch engineer of Exide Industrial Division of Electric Battery Co., retired Sept. 30. He will be succeeded by **George L. Nichols.** Hawkes had 46 years with the company.

• **Arthur H. Greisser** has been appointed superintendent of production for Portland General Electric Co. He will direct operation and maintenance of the company's generating plants, hydroelectric and steam, and supervise direct power operations.

Death

• **Earle D. Gilpin,** Seattle, retired electrical engineer, died Sept. 13. He was employed by the Van S. McKenny Electrical Co. for 41 years.

NEW MD5 HYTOOL

lightweight champ with a heavyweight punch!

Jaw variations make this the versatile, durable tool you can afford to put on every truck. Low in cost, big in performance this new 4¾ lb. MD5 delivers a 6000 lb. force to install a range of distribution connectors on all conductors through 2/0 ACSR.

It's designed to stand the roughest field treatment. Jaws are of heat treated steel. A set screw adjustment compensates for wear. Die letters or numbers on each groove correspond to connector markings to assure correct crimping. Handle grips color-coded for easy identification.

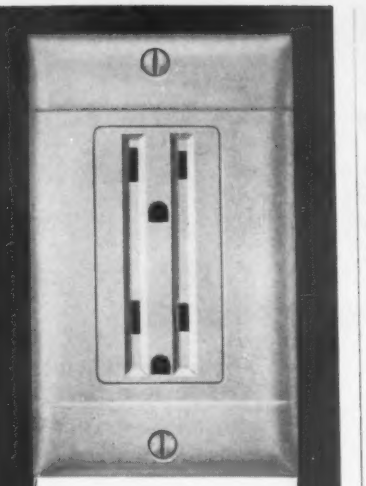
Your Burndy representative will be glad to demonstrate the advantages of the MD5.

MD5 HYTOOL Installs Hysplices on #4, #2, 1/0 and 2/0 ACSR
Aluminum up thru 1/0, copper up thru #2 and
Crimpits, Eltaps, Linkits, etc. up thru 1/0

BURNDY

56-14

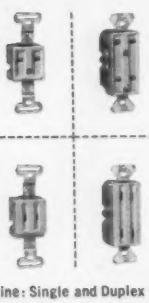
Norwalk, Connect. • Toronto, Canada • Other Factories: New York, Calif., Toronto • Export: Philips Export Corp.



SIERRAPLEX
receptacles...

In a distinctive new design that shows at a glance you have installed the finest on the market today. Made only in Specification Grade, these receptacles with their clean, contemporary appearance will enhance your reputation with architect and builder.

Sierra



Full line: Single and Duplex units in Tandem and Parallel slots; both grounding-type and two-wire. Each complemented with matching wall plate.

SIERRA ELECTRIC CORPORATION
15100 S. FIGUEROA, P.O. BOX 65
GARDENA/CALIFORNIA

NOTES ON THE TRADE

• **R. S. Martin** has joined the Airtemp Division, Chrysler Corp., as district manager, West Coast region. He has held sales posts with Airtemp's San Francisco distributor and with the Hafey Air Conditioning Co., San Pablo. His new headquarters will be at the Dodge plant, Box 600, San Leandro, Calif.

• **Fred A. Pease,** Denver, is now exclusive sales representative for communications network components made by Burnell & Co. of Yonkers, N. Y., and Pasadena, Calif. He has the states of Colorado, Utah, Idaho and Wyoming.

• **Marvin C. Bonine** has been appointed manufacturing manager for the Pacific Switchgear Division of Federal Pacific Electric Co. in San Francisco.

• **Canadian Westinghouse** Co. has established its switchboard panel manufacturing and apparatus repair shop in new quarters in the Johnston Terminals building, 281 Industrial Ave., Vancouver, B. C.

• **Charles R. Long,** formerly with Westinghouse in San Francisco, has joined J. W. Marsh Co. as head of northern California industrial sales.

• **Pennsylvania Transformer** Co. is offering rural transformer users a convenient slide rule price and data selector free of charge. It covers the company's full line of Pole Star rural transformers, and gives list prices, electrical data and mechanical dimensions. Write to the company at Box 330, Canonsburg, Pa.

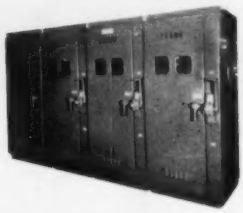
• **The Curry** Co., 2624 26th Ave., San Francisco, is a new representative of the International Corp. of Los Angeles.

• **Frumhoff & Cohen** is the name of a new electrical design service company located at 7024 Melrose Ave., Los Angeles.

• **Square D** Co. Ltd., Canada, has established an assembly plant at Burnaby, B. C. Commercial lighting and power distribution panels, switchboards, special control panels and motor control centers will be produced. R. D. Weeks, district manager in B. C., has moved his offices to the new plant.

S & C, Specialists In High-Voltage Switchgear Since 1910, Say:

DOES YOUR MAINTENANCE CREW SPEND SUNDAYS SERVICING METALCLAD SWITCHGEAR?



When HIGH VOLTAGE Switchgear gets rusty power must be cut off for repairs and repainting. That means service work must be done on overtime, when the plant is not operating.

S&C believes that Metalclad Switchgear should be out of sight and out of mind—except on those rare occasions when it operates as a protective device, or when switching is necessary.

S&C USES SUPER DURABAKE—A new finish for Metalclad Switchgear. It prevents rust, eliminates maintenance wherever installed. Super Durabake withstands high temperatures, high humidities, blasting effects of wind and sand, and corrosive atmospheres.

For further information, contact

GEO. E. HONN CO.
420 Market Street, San Francisco
SUtter 1-7352

for AIRPORT RAILROAD BUS.... TERMINALS

One Fixture Cost . . . One Installation Cost

NEO-RAY ROTO-STRIP
C.S.A. APPROVED Pat. Pend.

Sufficient illumination right where you want it. That's why airline, railroad and bus terminals rely on ROTO-STRIP. Illustration shows ROTO-STRIP highlighting schedule on wall and providing adequate light on counter.

This complete shallow unit (available for surface, corner or recessed mounting) has built-in recessed roto sockets that swing 90° in all directions through a complete 360° circle . . . and stay put at any angle. Available in stock sizes of 2', 3', 5' and 8' lengths.

Surely Roto-Strip has a place in your plans.

Send For Complete Catalog No. 541B • ***Sold Through Wholesale Distributors***

California Nevada — **Robert J. Arthur, 420 Market St., San Francisco 11, Calif.**

Mfrd. by: NEO-RAY PRODUCTS, INC., 315 E. 22nd St., New York 10, N. Y.

In between visitors at the General Electric Co. exhibit at the National Electrical Contractors Assn. Exposition, George Wagner briefed Norman A. Schiewe on features of new circuit protective equipment. Wagner was recently promoted to product sales specialist in the assemblies and components section and Schiewe, formerly with Pacific Gas and Electric, was appointed merchandising specialist to fill Wagner's former job

• **Clyde H. Wood,** Westinghouse agency and construction manager for the Pacific Coast region, leaves California to become general sales manager of Bryant Electric Co., a Westinghouse subsidiary.

• **Fluorescent Fixtures of California** announces several personnel changes in the sales department. **Richard E. Liepold** is promoted to San Francisco regional sales manager, **Mervin J. Hooey** is new regional sales manager for all districts except San Francisco, **Fred J. Bertolone** is assistant regional sales manager and **Thomas S. Rutherford** is office sales manager.

• **William A. Horning,** 902 Friedel Ave., Vancouver, Wash., has started his own manufacturing representative business under the name of Bill Horning Sales. His lines are Jasper Blackburn Corp., Peiper-Lillard Inc. and Victor Specialties. The agency will cover Washington and Oregon.

• **Yale & Town** Mfg. Co. is going to construct a lift truck sales and service branch in Los Angeles as the first step in a general Western expansion plan. The new branch is presently operating from temporary quarters.

• **Donald E. Alworth** has been appointed a service engineer for the Rocky Mountain region of Allis-Chalmers Industries Group, with headquarters in Denver.

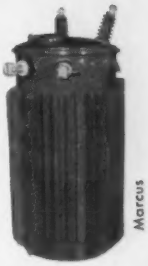
A NEW APPROACH TO INSULATING PROBLEMS

Layer insulation for transformers with

Electro self-bonding lectronic board

easier to use
saves winding time
provides plus protection

insulation is where you need it



ELECTRO PRE-IMPREGNATED LECTRONIC BOARD offers an improved method of insulating transformers. When used as layer insulation you're sure of a varnish bond all the way through . . . the base paper is coated with a heat activated resin. The coil assembly is assured of uniform protection against failure as the laminating action of the LECTRONIC BOARD, after being subjected to heat, forms a compatible bond with the varnish dip. WRITE FOR COMPLETE INFORMATION TO DEPT. E14-1181.

A Division of Sun Chemical Corporation

Electro-Technical Products

113 Centre Street, Nutley 10, New Jersey

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN (paints, maintenance and construction materials, industrial coatings) • WARWICK (textile and industrial chemicals) • WARWICK WAX (refiners of specialty waxes) • RUTHERFORD (lithographic equipment) • SUN SUPPLY (lithographic supplies) • GENERAL PRINTING INK (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • MORRILL (news inks) • ELECTRO-TECHNICAL PRODUCTS (coatings and plastics) • PIGMENTS DIVISION (pigments for paints, plastics, printing inks of all kinds) • OVERSEAS DIVISION (export) • A. C. HORN COMPANY, LIMITED (Canada) • GENERAL PRINTING INK CORPORATION OF CANADA, LIMITED • FUCHS & LANG de MEXICO, S. A. de C. V.

HOW TO ESTIMATE THE COST of any electrical job

This book is packed with time-saving methods that help you streamline your estimating procedures—give you the knowledge that means safer and more dependable bids. Covers everything from the selection and training of electrical estimators and the proper use of estimating tools to preparation of final bid sheets.

ELECTRICAL ESTIMATING

By Ray Ashley

Member, Chicago Electrical Estimators' Assn.

2nd Ed. 363 pages, illustrated. $8.00

Covers . . .

- estimating forms
- estimating tools and their proper use
- studying plans and specifications
- taking off quantities
- listing and checking material quantities
- checking completed estimates
- and many other practical subjects

CLEAR explanations, plus sample estimates and guides, show you how to handle lighting and power branch wiring—distribution equipment—overhead and markups—estimating special projects and residential wiring. Time studies and preparation of labor cost units are examined in detail.

SEE THIS BOOK 10 DAYS FREE

McGraw-Hill Book Co., Inc. Dep't FWest 9-56
327 W. 41st St., New York 36

Send me Ashley's Electrical Estimating for 10 days' examination on approval. In 10 days I will remit $8.00, plus few cents delivery costs, or return book postpaid. (We pay delivery costs if you remit with this coupon; same return privilege.)

Name
Address
City Zone State
Company
Position

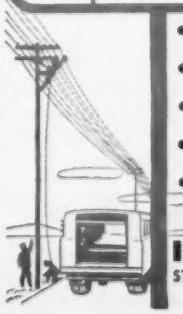
(For prices outside the U. S., write to McGraw-Hill Int'l, New York 36) FWest 11-56

INDIANA STEEL & WIRE CO. Crapo Galvanizing MUNCIE, IND.

Signs along the lines of *Crapo* GALVANIZED STEEL STRAND PERFORMANCE

For dependable performance . . . insist upon *Crapo* Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes *Crapo* Steel Strand first choice for guys, messenger and overhead ground wire.

The famous *Crapo* galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.



- Low maintenance cost
- Laboratory tested and controlled quality
- Meets highest quality standards
- A size and grade for all practical needs
- Contact your *Crapo* Jobber Today!

INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

T. W. Briegel Jr., left, sales manager of Briegel Method Tool Co., and Ernest F. Hauch, San Francisco manufacturers representative for the company, demonstrate the old and the new in crimping tools at the National Electrical Contractors Assn. Exposition in San Francisco. Briegel, using one hand and a new crimping tool, had a good time showing visitors that the tool did a better job with less effort than the old one used by Hauch

• **Jerry Jones** is now district sales representative for General Electric communications equipment at Redwood City, Calif.

• **Arthur F. Neel** is new sales manager of the Los Angeles division of Connor Spring Mfg. Co. He has been with Connor since 1952, and before that was with the hydraulic design office of the Bureau of Reclamation in Sacramento.

• **Andrew L. Polich** has been appointed sales representative for S&C Electric Co. in Idaho, Montana and Oregon. Prior to forming his own sales agency in 1954, Polich was with General Electric Supply Co. in the Pacific Northwest, and before that served with the National Defense Power Committee, the University of California and the office of Scientific Research and Development.

• **Pacific Oerlikon** Co., Tacoma, has changed its name to United Power Control Corp. It is affiliated with the Oerlikon Co. of Switzerland.

• **Automatic Switch** Co. has moved to larger quarters at 1233 Goodrich Blvd., Los Angeles. The new location houses sales, service and stock of the Pacific Coast factory branch.

• **Lyman L. Clark** is new sales manager of the Westinghouse Sunnyvale, Calif., plant. He succeeds **Thomas R. Lawson** who has been promoted to manager of the Westinghouse control department in Buffalo, N. Y. **Harry H. Humphrey** replaces Clark as transformer sales manager.

• **Harvey Machine** Co. Inc. has taken steps to organize a new division called **Harvey Aluminum Structures.** The division will be organized by Dr. J. Morley English, who is on leave from the University of California at Los Angeles. Among the products of the new division will be transmission towers and substations.

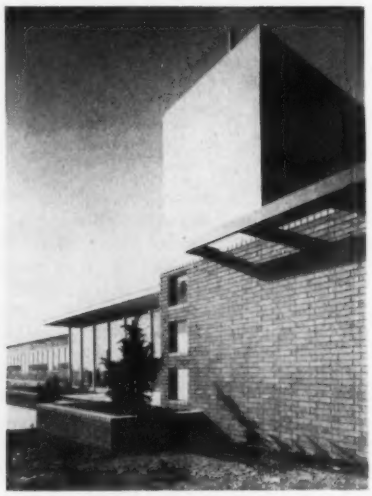
• **Electrical Specialty** Co. has established a new office at 1224 S.W. Morrison St., Portland. Jim McLean moves from Seattle to head the new branch.

• **Brian J. Sturman** Jr. has been appointed assistant manager of the Westinghouse manufacturing and repair plant at Huntington Park, Calif.

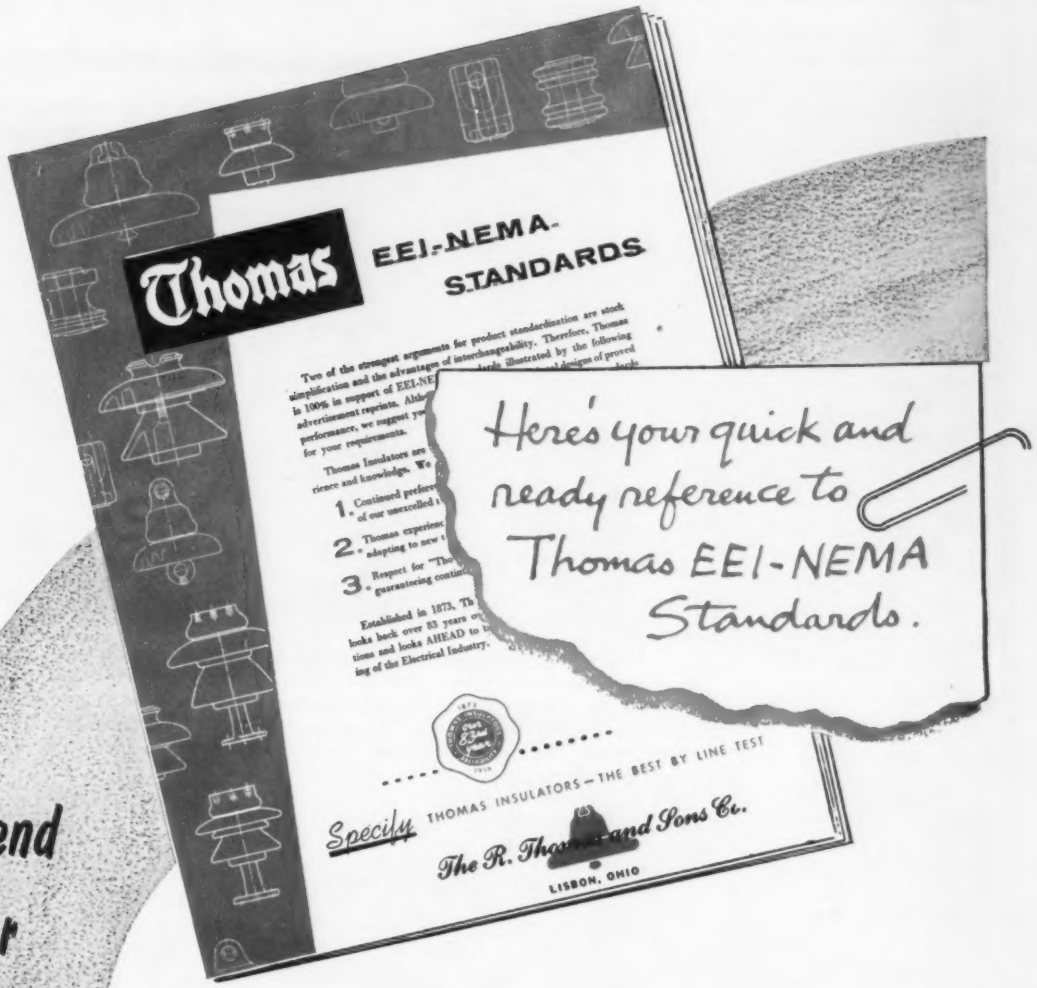
• **Herbert G. Schubert** has been appointed advertising manager of Cannon Electric Co., Los Angeles. He succeeds **Leslie E. Baird** who recently resigned.

• **James W. Mahoney** has been elected president and general manager of Day-Brite Lighting Inc. of California. Executive and Los Angeles sales offices are at 8421 Wilshire Blvd.

• **"Transformers in the Making,"** a 16-mm sound color movie, is available on loan from L. C. Dobrunz, sales promotion manager of Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo. It shows progressive steps in the manufacture of power and distribution transformers from tank fabrication to shipping.



Sylvania Electric Products Inc. has opened two new West Coast distribution centers, one (left) in Los Angeles and the other in the San Francisco area. The Los Angeles building, at 6505 E. Gayhart St., boasts 87,000 sq ft, and the second building, at 1811 Adrian Rd., Burlingame, has 79,000 sq ft. Each distribution center will stock all Syvlania products except television sets. Offices are show places for demonstrating the various lighting fixtures


Thomas
EEI-NEMA
STANDARDS
Here's your quick and ready reference to Thomas EEI-NEMA Standards.
Specify THOMAS INSULATORS — THE BEST BY LINE TEST
The R. Thomas and Sons Co.
LISBON, OHIO

Send for Your Free Copy Today . . .

The complete line of THOMAS EEI-NEMA PORCELAIN INSULATOR STANDARDS is illustrated and identified both by EEI-NEMA Class Numbers and by THOMAS Catalog Numbers.

This new eight-page bulletin is the kind of ready reference you'll want at your fingertips — for convenience in selecting and ordering standard SUSPENSION, PIN-TYPE, APPARATUS, GUY-STRAIN or SPOOL Insulators for all applications.

THE R. THOMAS & SONS CO.
Lisbon, Ohio

Gentlemen: Please send my copy of the new THOMAS EEI-NEMA Standards Bulletin.

Name _____

Company _____

Street _____

City _____ Zone _____

State _____

INDEX TO ADVERTISERS
Directory Issue Part I
November 1956

Advance Transformer Co. 23
Allen-Bradley Co. 151, 152
Allis-Chalmers Mfg. Co. 13, 77
American Steel & Wire Div. 4, 5
American Tel & Tel 83
Anaconda Wire & Cable 147
Anderson Electric Corp. 140
Appleton Electric Co. 14, 15

Bechtel Corp. 155
Briegel Method Tool Co. 72, 73
BullDog Electric Products Co. 69
Burndy Corp. 163

Cable Spinning Equipment Co. 156
Carol Cable Div. Crescent Co. 159
Chance Co., A. B. 16
Copperweld Steel Co. 29
Curtis Lighting, Inc. 61

Day-Brite Lighting, Inc. 41
Driver-Harris Co. 144
DuPont deNemours & Co., Inc., E. I. 157

Electro-Technical Products Div., Sun Chemical Corp. 165
Electro-Motive Div., General Motors Corp. 64, 65

Fanner Mfg. Co. 154
Federal Pacific Electric Co. 47

G & W Electric Specialty Co. 62
General Cable Corp. 71
General Electric Co.:
Plainville, Circuit Protective Devices Dept. 118
Schenectady, Apparatus Div. 17, 18, 19, 20, 30, 31, 42, 43, 86, 156
Globe Lighting Products, Inc. 54
Greenlee Tool Co. 10

Holophane Co. Inc. 123
Honn Co., George E. 164
Hubbard & Co. 125

Indiana Steel & Wire Co., Inc. 165
I-T-E- Circuit Breaker Co. 34, 35

Johns-Manville 36

Kearney Corp., James R. 116, 117
Kerite Co. 143
Killark Electric Co. 12
Klein & Sons, Mathias 160
Kuhlman Electric Co. 7

Lapp Insulator Co. Inc. 49, 50, 51, 52
Line Material Co. 3

Marcus Transformer Co. Inc. 158
Minnesota Mining & Mfg. Co. 28
Maloney Electric Co. 136, 137
McGraw-Hill Book Co. 165

National Electric Products Corp. 27
National Tele Supply Co. 148
Neo-Ray Products, Inc. 164

Ohio Brass Co. 78

Pacific Coast Elec'l Association ..... 4th Cover
Pacific Gas and Electric Co. ..... 3rd Cover
Pennsylvania Transformer Co. 37, 38, 39, 40
Phelps Dodge Copper Products Corp. 33
Porcelain Products, Inc. 146
Preformed Line Products Co. 11
Pyle-National Co. 150

Republic Steel Corp. 53
Revere Electric Mfg. Co. 153
Rockbestos Products Corp. 32
Rome Cable Corp. 44, 45

S & C Electric Co. 24, 25
Sangamo Electric Co. 56
Sierra Electric Corp. 164
Simplex Wire & Cable Co. 21
Smith Co., S. Morgan 48
Smoot-Holman Co. 1
Southern California Edison Co. ..... 2nd Cover
Southern States Equipment Corp. 9
Square D Co. 22
Steber Mfg. Co. 161
Subex, Inc. 122
Sunbeam Lighting Co. 139

Tel-E-Lect Products, Inc. 158
Thomas & Sons Co., R. 167
Triangle Conduit & Cable Co. 55

U. S. Rubber Co. 57
U. S. Steel Corp. 4, 5

Victor Insulators Div. I-T-E Circuit Breaker Co. 63

Wadsworth Elec. Co., Inc. 160
Western Insulated Wire Co. 160
Westinghouse Electric Corp. 26, 58, 59, 74, 75, 127, 128, 129, 130, 131, 132, 133, 134
Wiremold Co. 8

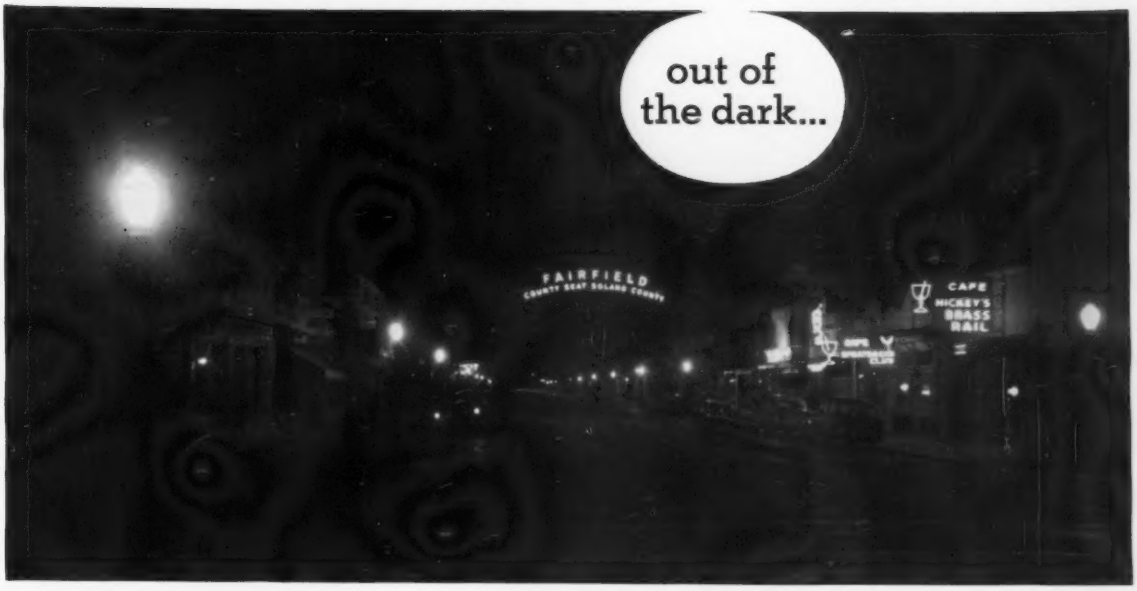
Youngstown Sheet & Tube Co. 46

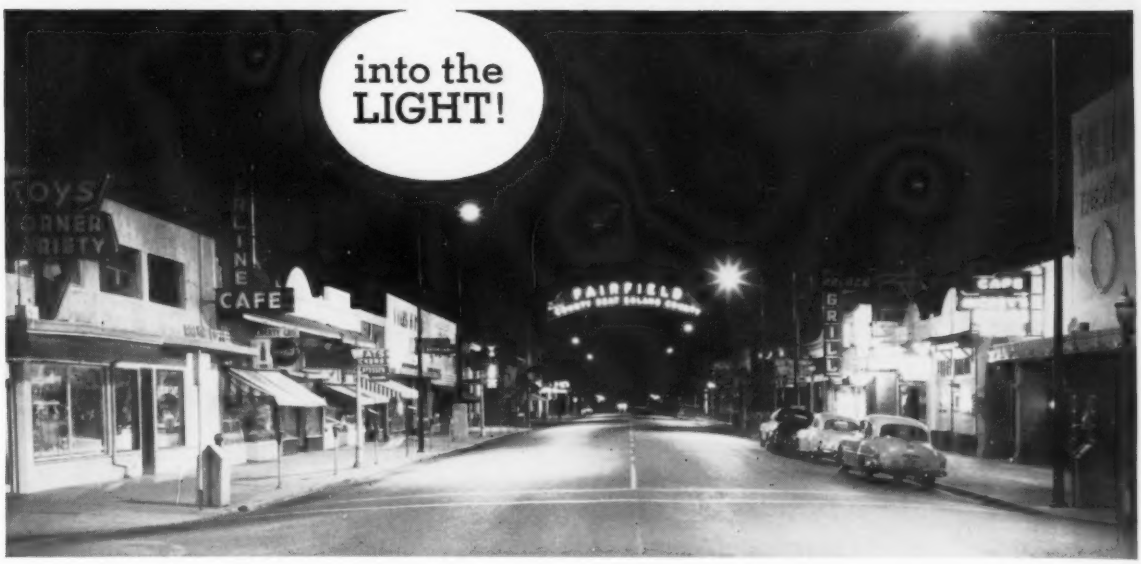
PROFILES

Two winners from the West won awards in the national runoff of the Illuminating Engineering Society's "My Most Interesting Lighting Job" contest. At left is Dorothy McGregor, British Columbia Electric Co., who won second prize. Third from left is Bill Jones, Smoot-Holman Co., Inglewood, who won first prize. Other winners, E. H. Schaefer, Milwaukee, and Louis N. Goodman, New Orleans, won third and fourth awards in the contest

About 1,500 members of the American Society for Testing Materials attended the recent meeting at Los Angeles. National President R. A. Schatzel (at left in photo) said the society is currently working with the Atomic Energy Commission to determine the effects on materials of radioactivity. Schatzel, who is president of Rome Cable Co., is shown here with C. M. Wakeman (center) of the Los Angeles Harbor Department, and C. H. Fellows of Detroit Edison. Schatzel said the society now has more than 13,000 members

FAIRFIELD California:





See the amazing difference proper street lighting can make!

As Mayor Allan Witt puts it: "We didn't realize how 'in the dark' we were until P. G. and E. installed modern lighting on downtown streets. It makes a tremendous difference in the looks of the city, besides reducing crime and accident rates!"

Cost to Fairfield? Not one cent!—for P. G. and E.'s lighting survey . . . for the lighting plans . . . for installation of the new lights! Fairfield's only cost is a nominal increase in the monthly electric bill to cover the cost of new mercury lamps and standards.

In the last ten years, P. G. and E. has shown more than 80 Northern California cities how to brighten dangerous and outdated street lighting. Our lighting engineers will do the same for *your* community. There's no charge or obligation, of course! Why not take the first step to brighter streets—soon?

For a free lighting survey contact your local P. G. and E. office **P·G and E·**

Pacific Gas and Electric Company

* قوّة كهرباء البيت

* Means HOUSEPOWER in Arabic . . .

Take it from this modern day Sheik of Araby—HOUSEPOWER—*full* HOUSEPOWER—is real *cool!* It's the most (to say the least) dynamic new concept in the electric industry's lexicon of selling terms.

For the first time in the history of electrical merchandising, the entire industry has gathered behind the banner of a single word—HOUSEPOWER—and pushed it into the public's awareness nationally. As a result, our industry's customers everywhere are gaining a new appreciation and understanding of the *in*adequate wiring problem that confronts four out of five householders today.

Make your own selling job easier by putting the sales power of HOUSEPOWER to work for you! Promote it at every opportunity! For complete details about the HOUSEPOWER promotion, as well as other PCEA activities, contact either of our offices.

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street, Los Angeles 14, California

681 Market Street, San Francisco 5, California